

Working on Waste

February 9, 2004

Chair of the Air Resources Council
c/o DES, Air Resources Division
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095
ATTN: ARC Council Clerk
Hand-Delivered

RECEIVED

FEB 09 2004

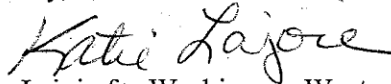
04-04 ARC

Re: Notice of Appeal

Dear Chair of the Air Resources Council,

On January 28, 2004, the Department of Environmental Services issued a Proposed Title V Operating Permit for the Wheelabrator incinerator in Claremont, NH. Enclosed is Working on Waste's appeal of that decision.

Sincerely,



Katie Lajoie for Working on Waste
PO Box 641
Claremont, NH 03743

Enc.

Original and 15 copies provided to the Air Resources Council

Copy also provided to:

- Robert Scott, Director, New Hampshire DES Air Resources Division
- Robert Varney, Environmental Protection Agency, Region 1
- Ida Gagnon, Environmental Protection Agency, Region 1
- Peter Kendrigan, Wheelabrator Claremont Company
- Mayor Scott Pope, City of Claremont, N.H.
- Representative James Phinizy, Chairman, Sullivan County Delegation

Note: The 10th day following the permit decision was Saturday, February 7. Pursuant to Env-A 202.01 (a), the appeal is filed Monday, February 9.

**Working on Waste
Before the Air Resources Council
Notice of Appeal**

Proposed Title V Operating Permit
Wheelabrator Claremont Company, L.P.
Facility Identification No. 3301900029
Application No. FY96-TV010
Permit No. TV-OP-050

In accordance with Env-A 206.09, Env-AC 206.02, Env-AC 206.03, and RSA 125-C:12, III, Working on Waste (WOW) appeals the decision of the New Hampshire Department of Environmental Services (DES) to issue a Proposed Title V Operating Permit (Title V Permit) to Wheelabrator Claremont Company, L.P. The permit was issued on January 28, 2004 by Robert Scott, Director, Air Resources Division, DES.

WOW is a citizens' initiative working to promote sustainable resource management in Sullivan County. Since 1985, WOW has participated in hearing and permitting activities associated with the Wheelabrator incinerator in Claremont. WOW is registered with the Charitable Trusts Unit, State of New Hampshire.

DES' decision to issue the Title V Permit for Wheelabrator Claremont:

- 1) ignores economic and social values that are protected under the New Hampshire Constitution (Bill of Rights, articles 1, 2, 8, and 38, appended hereto);
- 2) ignores emerging and established research concerning incinerator pollution;
- 3) fails to address when or how DES would revoke the permit;
- 4) fails to promote public health, welfare, and safety in accordance with state law (RSA 125-C:1).

CONSTITUTIONAL RIGHTS

The Title V permit process is biased in Wheelabrator's favor because the only factor considered for issuance of the permit is whether Wheelabrator complies with air emission standards. There

is no evidence these standards protect public health, and a growing body of research shows that they do not.

A narrow focus on air emission standards ignores economic and social values that are protected under the New Hampshire Constitution. These include the right to fiscal accountability and protection of public health. As public servants, New Hampshire regulators and policy officials have the responsibility to assess and act upon environmental, public health, social, and economic benefits that would accrue for the public with closure of the incinerator.

WOW raised these issues with DES in an August 8, 2003 letter addressed to Michele Andy, Title V Permit Program Manager (copy appended hereto). Here WOW reiterated a proposal presented to DES at a Title V public hearing in Claremont on July 29, 2003. The proposal calls for professionally facilitated stakeholder meetings to thoroughly assess incinerator impacts and safe alternatives.

In a letter to DES Commissioner Michael Nolin dated July 29, 2003, State Representative James Phinizy stated that the Wheelabrator incinerator in Claremont "should not be granted a permanent operating permit, as there are outstanding and unresolved health concerns and economic issues that have been raised as a result of the waste facility's continued operation" (page 1, copy of letter appended hereto). Rep. Phinizy said it is "imperative" for DES to work with the Sullivan County delegation, with Executive Council members Raymond Burton and Peter Spaulding, and with the Office of the Governor "towards the most sensible way in which this facility may be decommissioned in the shortest time possible" (page 4).

On page 21 of the Findings of Fact and Director's Decision that were issued with the Title V Permit (hereafter Findings and Decision, copy appended hereto), DES provides only one line acknowledging the suggestion "that a transition to a recycling-based system could replace incineration." However, DES devotes a paragraph to Wheelabrator's assessment of the recycling situation in Sullivan County. What is not mentioned is that resources cannot be both burned and recycled and that Wheelabrator imports waste to make up for lost tonnage that results from local recycling.

DES promotes Wheelabrator's position but fails to provide equal consideration for solid waste management options that do not include incineration.

INCINERATOR POLLUTION

DES errs when it states that "no evidence has been presented to date that supports the denial of a Title V Operating Permit to the Wheelabrator Claremont facility" (Findings and Decision at page 23). During the Title V comment period WOW provided DES with an in-depth analysis of pollution from the incinerator (Analysis of Air Emissions, Wheelabrator Claremont Company Incinerator, 1987-2002, hereafter WOW Report, copy appended hereto). The WOW Report raises issues that DES has failed to address. These include:

- 1) the inability of end-of-the-pipe emission standards to protect public health (pages 3-4, 20-22);
- 2) how incineration increases exposure risks by causing the release of toxic metals into air and ash in a highly bio-available form (page 7);
- 3) the failure of DES' Ash Landfill Study and DES' Dioxin Reduction Strategy to adequately assess the hazards of ash (pages 9, 21-22);
- 4) the advantages of waste reduction and recycling over incineration (page 24).

In addition, the public record contains a copy of Incineration and Human Health: State of Knowledge of the Impacts of Waste Incinerators on Human Health (Greenpeace Research Laboratories, University of Exeter, United Kingdom. March 2001. Website and table of contents appended hereto). This report also shows why incineration presents unacceptable risks to public health.

The WOW Report states that at least 7,500,000 pounds of toxic chemicals were released by the Wheelabrator incinerator into the air over Claremont from 1987-2002. This amount underestimates the pollution because many of the air emissions from the incinerator are not monitored. The cost of health and environmental impacts related to the Claremont incinerator is calculated at \$ 6,000,000 per year for area residents (WOW Report at pages 1-2, 23).

Pages 3 and 4 of the WOW Report address cumulative and synergistic impacts. DES acknowledges that it is “essentially impossible to evaluate” the “cumulative toxic effects of the emissions of multiple pollutants and the long-term accumulation of persistent toxic pollutants” (Findings and Decision at page 19). **This fact alone is reason to deny the Title V Permit.** WOW has extensively documented the public health and environmental threats associated with persistent toxic substances (WOW Report at pages 6-18).

PERMIT REVOCATION

Section XIX of the Title V Permit states that the permit can be suspended, revoked, or nullified by DES (page 52). However, there is no explanation as to the conditions that would need to be in place for DES to do this.

The public record indicates hundreds of recorded permit violations for carbon monoxide (CO) and steam rate, two parameters that are monitored on a continuous basis (WOW Report at page 20). These violations have been ongoing since 1987.

In response to the CO violations, DES extrapolated data for 1997 to the present and determined that the 80 three-hour rolling periods of CO exceedances accounted for 0.07% of total operation time (Findings and Decision at pages 8 and 9). DES also reports that the “percentage of CO exceedances” at the incinerator is “within the acceptable range” allowed by the Environmental Protection Agency (Findings and Decision at page 10).

Calculating non-compliance as a percentage of total operation time skews the issue in Wheelabrator’s favor. Excusing permit violations in this manner is akin to a driver arguing that motor vehicle violations should be excused because violations represent only a small portion of the total amount of time spent driving.

In addition, the Title V Permit mandates periodic stack testing for those pollutants that are not continuously monitored (pages 22-23 and 32-35). These pollutants include dioxin, lead, cadmium, and mercury. Here the permit provides great latitude for Wheelabrator.

The most salient problem with periodic testing is that test results are considered representative of ongoing emission levels if the results are within permit limits, but are not considered representative if the results exceed these limits. Exceedances merely trigger additional testing.

The Title V Permit fails to indicate when or how DES would determine non-compliance and when or how the permit would be revoked.

Snapshot stack testing is also problematic because the waste coming into the incinerator is heterogeneous, making determination of actual air emissions on any given day impossible. It is unacceptable for DES to consider Wheelabrator in compliance with permit conditions based on yearly or less frequent testing. It is also unacceptable to regard exceedances as an anomaly that can be "corrected" with repeat testing.

PROMOTION OF HEALTH, WELFARE, AND SAFETY IN ACCORDANCE WITH STATE LAW

The following has occurred since the incinerator began operating in 1987:

- 1) a million tons of waste burned (which is more garbage than Claremont itself would normally produce in 100 years);
- 2) at least 7,500,000 pounds of toxic air emissions;
- 3) approximately 400,000 tons of incinerator ash that present a risk in perpetuity;
- 4) expensive electricity;
- 5) barriers to waste reduction and recycling.


DES ' decision to issue the Title V Permit fails to comply with RSA 125-C:1, which states:

It is hereby declared to be the public policy of the state of New Hampshire and the purpose of this chapter to achieve and maintain a reasonable degree of purity of the air resources of the state so as to promote the public health, welfare, and safety, prevent injury or detriment to human, plant, and animal life, physical property and other resources, foster the comfort and convenience of the people, promote the economic and social development of this state and to facilitate the enjoyment of the natural attractions of the state.

There is no evidence that the Title V Permit promotes public health, welfare, and safety, especially for residents of Claremont and surrounding communities. However, there is evidence that waste management based on reduction and recycling does fulfill the goals of RSA 125-C:1. Sullivan County residents deserve the same opportunities for sustainable resource management that communities without incinerators enjoy. It is imperative that DES uphold the public's right to equal protection under the law and give consideration to closure of the Wheelabrator incinerator in Claremont.

The Title V Permit impedes the broad discussion necessary to move toward safe and equitable solid waste management in Sullivan County. The Air Resources Council should therefore reverse DES' decision. The Title V Permit should be denied because it is neither reasonable, safe, nor in the public interest.

Original and 15 copies submitted February 9, 2004 to the Air Resources Council by
Working on Waste, PO Box 641, Claremont, NH 03743


Katie Lajoie on behalf of Working on Waste

Copy:

Robert Scott, Director, New Hampshire DES Air Resources Division
Robert Varney, Environmental Protection Agency, Region 1
Ida Gagnon, Environmental Protection Agency, Region 1
Peter Kendrigan, Wheelabrator Claremont Company
Mayor Scott Pope, City of Claremont, N.H.
Representative James Phinizy, Chairman, Sullivan County Delegation

Enclosures
Appeal of Working on Waste

- 1) New Hampshire State Constitution, Bill of Rights, Articles 1, 2, 8, and 38.
- 2) Working on Waste. Letter to Michele Andy, Title V Permit Program Manager, NH Department of Environmental Services. August 8, 2003.
- 3) Representative James Phinizy. Letter to Michael Nolin, Commissioner, NH Department of Environmental Services. July 29, 2003.
- 4) NH Department of Environmental Services. Findings of Fact and Director's Decision, In the Matter of the Issuance of a Title V Operating Permit to Wheelabrator Claremont Company, L.P. Located in Claremont, New Hampshire. January 28, 2004.
- 5) Working on Waste. Analysis of Air Emissions, Wheelabrator Claremont Company Incinerator, 1987-2002. June 2003 (revised July 2003).
- 6) Website and table of contents. Greenpeace Research Laboratories. Incineration and Human Health: State of Knowledge of the Impacts of Waste Incinerators on Human Health. March 2001.

**NEW HAMPSHIRE STATE CONSTITUTION
ESTABLISHED OCTOBER 31, 1783 TO TAKE EFFECT JUNE 2, 1784 AS
SUBSEQUENTLY AMENDED AND IN FORCE DECEMBER 1990**

BILL OF RIGHTS-ARTICLES 1, 2, 8, and 38

Article 1. [Equality of Men; Origin and Object of Government.]. All men are born equally free and independent; therefore, all government of right originates from the people, is founded in consent, and instituted for the general good.

*June 2, 1784**

**The date on which each article was proclaimed as having been adopted is given after each article. This is followed by the year in which amendments were adopted and the subject matter of all the amendments.*

[Art.] 2. [Natural Rights.] All men have certain natural, essential, and inherent rights - among which are, the enjoying and defending life and liberty; acquiring, possessing, and protecting, property; and, in a word, of seeking and obtaining happiness. Equality of rights under the law shall not be denied or abridged by this state on account of race, creed, color, sex or national origin.

June 2, 1784

Amended 1974 adding sentence to prohibit discrimination.

[Art.] 8. [Accountability of Magistrates and Officers; Public's Right to Know.] All power residing originally in, and being derived from, the people, all the magistrates and officers of government are their substitutes and agents, and at all times accountable to them. Government, therefore, should be open, accessible, accountable and responsive. To that end, the public's right of access to governmental proceedings and records shall not be unreasonably restricted.

June 2, 1784

Amended 1976 by providing right of access to governmental proceedings and records.

[Art.] 38. [Social Virtues Inculcated.] A frequent recurrence to the fundamental principles of the constitution, and a constant adherence to justice, moderation, temperance, industry, frugality, and all the social virtues, are indispensably necessary to preserve the blessings of liberty and good government; the people ought, therefore, to have a particular regard to all those principles in the choice of their officers and representatives, and they have a right to require of their law givers and magistrates, an exact and constant observance of them, in the formation and execution of the laws necessary for the good administration of government.

June 2, 1784

Working on Waste

August 8, 2003

Michele Andy
Title V Permit Program Manager
NH Departmental of Environmental Services
Air Resources Division
Concord, NH
Hand-Delivered

Re: Title V Permit Application, Wheelabrator Claremont Company

Dear Ms. Andy,

Working on Waste (WOW) submits these comments to the record for the Title V permit application referenced above. This submittal follows two WOW reports that were provided to the Title V docket in July. The first report, Analysis of Air Emissions- Wheelabrator Claremont Company Incinerator 1987-2002, explains why the Title V permit should not be issued to Wheelabrator. The second report, Closing the Wheelabrator Incinerator in Claremont: A Blueprint for Public Officials & The People They Serve, offers an alternative to waste incineration in Sullivan County.¹ These two reports were also provided to the New Hampshire Department of Health and Human Services (DHHS) and to Ida McDonnell, Region 1 Environmental Protection Agency (EPA).

Pollution records on file with the New Hampshire Department of Environmental Services (DES) indicate that at least 7,000,000 pounds of toxic pollutants have been emitted into the air by Wheelabrator during a 15-year period (1987-2002). WOW has explained why these pollutants are an unacceptable risk to public health. WOW has also

¹ The submittal concerning air emissions included two outside reports: (1) Christopher Neurath (1993) *Incineration Compared to Energy and Waste Management Alternatives: A Full Environmental Costs Analysis*, and (2) Jeffrey Morris & Diana Canzoneri (1992). *Recycling Versus Incineration: An Energy Conservation Analysis*. These are included with the WOW reports sent to the copy list.

shown that safe alternatives to the incinerator provide economic and environmental protections that are lacking with the Wheelabrator incinerator.

Title V permit conditions for Wheelabrator ignore established and emerging research regarding cumulative and synergistic risks associated with incinerator pollution. Physicians for Social Responsibility, the International Joint Commission, the American Public Health Association, the National Association of Physicians for the Environment, the New England Governors and Eastern Canadian Premiers, and Greenpeace are among several organizations that have helped make pollution prevention a cornerstone of public health policy. WOW's air emissions report draws upon the work of these agencies and organizations to make a case for closing the Wheelabrator incinerator in Claremont.

The United States supports the international Persistent Organic Pollutants Treaty that was finalized in December 2000. The treaty addresses "the serious threat to human health and the environment"² caused by dioxin and other persistent organic pollutants. The American Public Health Association has also endorsed the treaty,³ supporting a "pollution-prevention" approach to dioxin, furans, and other unintentional by-products, with the aim of "eliminating" all significant man-made sources and releases. The Wheelabrator incinerator in Claremont is one such source.

The Title V permit process is biased in Wheelabrator's favor because the only factor considered for issuance of the permit is whether Wheelabrator complies with air emission standards. There is no evidence that these standards protect public health, and

² See US Statement on Persistent Organic Pollutants Treaty, December 10, 2000.
www.useu.be/ISSUES/pops 1210.html

³ Phibbs, P. (November 27, 2000). APHA Resolution Backs Elimination, Endorses Different Deadlines for Chemicals. Chemical Regulation Reporter. Bureau of National Affairs, Inc.: Washington, DC. p. 2247.

common sense dictates that eliminating Wheelabrator's pollution in Claremont would improve air quality and public health in the area.

A narrow focus on air pollution standards ignores political, economic, and social values that are protected under the New Hampshire Constitution (see Bill of Rights, articles 1, 2, 8, and 38). These include the right to fiscal accountability and protection of public health. As public servants, New Hampshire regulators and policy officials have the responsibility to assess and act upon the environmental, public health, social, economic, and political benefits that would accrue for the public with closure of the Wheelabrator incinerator in Claremont. Wheelabrator's Title V permit process impedes the broad discussion necessary to move toward safer and more equitable solid waste management. The Title V permit should therefore be denied. It is neither reasonable, safe, nor in the public interest.

New Hampshire RSA 125-C:1 states:

It is hereby declared to be the public policy of the state of New Hampshire and the purpose of this chapter to achieve and maintain a reasonable degree of purity of the air resources of the state so as to promote the public health, welfare, and safety, prevent injury or detriment to human, plant, and animal life, physical property and other resources, foster the comfort and convenience of the people, promote the economic and social development of this state and to facilitate the enjoyment of the natural attractions of the state [emphasis added].

There is no evidence that the Title V permit promotes public health, welfare, and safety, especially for the residents of Claremont and surrounding communities. However, there is evidence that waste management based on reduction and recycling do fulfill the goals of RSA 125-C:1. It is imperative that DES uphold the public's right to equal protection under the law and give consideration to closure of the incinerator.

The Wheelabrator incinerator in Claremont has a long and controversial history. The controversy concerns not only pollution but also Wheelabrator's high priced electricity and the company's relationship with Waste Management, Inc. Issuing a Title V permit creates an incentive for waste incineration well into the future. The public most impacted by the incinerator does not want this to happen, as evidenced by the two Air Resources Division hearings held this summer in Claremont.

In order to provide a fair process, WOW reiterates its support for stakeholder conferences that would bring together the parties involved in Wheelabrator's future.⁴ A professional facilitator could help ensure that the process is open, inclusive, and comprehensive. Under this format, participants working to close the incinerator would be afforded equal footing with Wheelabrator, a situation that does not exist under the Title V process.

At the July 29, 2003 public hearing in Claremont, WOW presented a closure plan that seeks to replace the incinerator with a recycling-based system. The steps incorporated into the plan are sensible and reflect a commitment to a healthy process for making decisions. The closure plan deserves DES' attention.

As we proceed with discussions regarding Wheelabrator, it is important to clear the air regarding conflict-of-interest. We therefore request that DES answer the following questions:

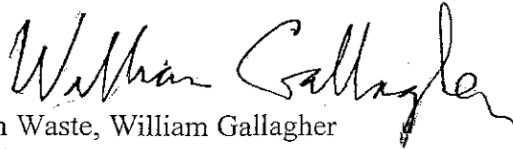
- Do any former DES employees presently work for Wheelabrator?
- Do any former Wheelabrator employees presently work for DES?

⁴ Stakeholders include (1) public officials, (2) Wheelabrator, (3) Public Service Company of New Hampshire, (4) health care professionals, (5) financial analysts, (6) public advocacy groups such as WOW, and (7) any other parties interested in resource management.

DES is poised to make a waste management decision with long-term implications for the Claremont area and the rest of Sullivan County. A decision most favorable to the public involves two steps:

- Deny the Title V permit for the Wheelabrator incinerator, and
- Work with other stakeholders to fully assess and address incinerator impacts and safe alternatives.

Sincerely,

A handwritten signature in black ink, appearing to read "William Gallagher". The signature is fluid and cursive, with the first name "William" and last name "Gallagher" clearly distinguishable.

Working on Waste, William Gallagher
PO Box 641
Claremont, NH 03743

Copy:

- Dennis Pinski, DHHS
- Ida McDonnell, EPA, Region 1
- Robert Varney, EPA, Region 1, with reports as referenced
- Michael Sills, DES, with reports as referenced
- Claremont City Council, with reports as referenced



State of New Hampshire

HOUSE OF REPRESENTATIVES

Legislative Office Building, 33 North State Street
Concord, NH 03301-6328

TEL: (603) 271-3403
TDD Access: Relay NH 1-800-735-2964

COMMITTEE ON ENVIRONMENT AND AGRICULTURE

Commissioner Michael Nolan
Department of Environmental Services
6 Hazen Drive
Concord, New Hampshire 03302

July 29, 2003

My Dear Mr Commissioner,

Please accept my congratulations upon your appointment. As the ranking Democrat on the Environment & Agriculture Committee, it would be a pleasure to meet with you in order to discuss certain environmental issues.

In advance of that meeting, however, there is an issue before your department which requires immediate attention. I refer specifically to application #**FY02-0138** for a permanent permit of the **Wheelabrator-Claremont Waste Facility, #3301900029 (the facility)**.

This facility should not be granted a permanent operating permit, as there are outstanding and unresolved health concerns and economic issues that have been raised as a result of the waste facility's continued operation. These issues, moreover, have not not been addressed by any state agency involved.

A case in point, were you to review maps detailing mercury pollution, you would see that there are two great fans indicating very high levels mercury pollution ("hot spots"), one of which emanates from the Claremont facility and incorporates those towns in direct line from Claremont to the Hillsboro/Concord/Bow area. Despite the fact that a 'scrubber' is to be installed on the facility, a significant amount of mercury, in excess of five pounds, will continue to pollute those lakes, streams and ponds that lie within this fly-way.

Sullivan District 23
Acworth, Charlestown & Langdon

Should these ponds and lakes continue to report very high levels of mercury pollution, which is highly likely, and should *Fish and Game* continue to post 'consumption advisories' for fish taken from these ponds, then it is certain that these towns, and the state, will suffer financial loss through reduced tourism and reduced fishing.

To date, neither the Department of Environmental Services nor the Department of Health and Human Services has done an "indepth", comprehensive study regarding the impact that the Wheelabrator-Claremont Waste Facility has had on the region's economic and environmental infrastructure. As an example, Charlestown (which incidentally is not a member of the facility's waste district) has to endure increased traffic through its village, noise, and pollution, all as a direct result of the facility's location. (n.b. the facility is situated on the town's northern boundary). It goes without saying that a study should be a pre-requisite prior to any future approvals.

In fact, the only comprehensive research on the effects of the facility from a health standpoint has been done by a local citizens group, "*Working on Waste*".

Recently, rules (**Env.-A 3300**) regarding emissions, operations, and performance standards for large and small municipal waste combustors ("*MWC Units*") were promulgated by the department. These rules were then submitted (April 2003) to the *Environmental Protection Agency* for review and comment. What is particularly outstanding is that these rules permit grossly higher percentage levels of toxic emissions for the Claremont facility, a so-called "*small MWC Unit*" as opposed to the larger Wheelabrator facility located outside of Concord. Attached is a copy of **Env.-A 3300, Municipal Waste combustion**, with the exception of mercury, as required by statute, and "opacity", you will

note that the emission limits proposed are significantly greater; moreover, there is no criteria for nitrogen oxide emission for a small Mwc Unit, specifically this facility.

Not only is this intolerable from the practical basis of reasonable expectations for the safety, health and welfare of the citizens of the region, but it ignores the long held tradition and constitutional mandate of equal treatment of all citizens by the state. This discrepancy is *de jure* environmental 'red lining' and *de facto* economic 'red lining'. The surrounding communities cannot, nor should not, be expected to absorb solely the costs and burden associated with such economic discrimination for the benefit of balance of the state.

At the very least, while the facility operates under a temporary permit, it is not unreasonable that the following criteria be imposed, specifically:

- 1) that the facility not be permitted to burn refuse for twenty four hours after an air quality day has been called, as a result of increased ozone levels. This criterion would prevent residents in the region from being exposed to inordinately high concentrations of pollutants during an inversion;

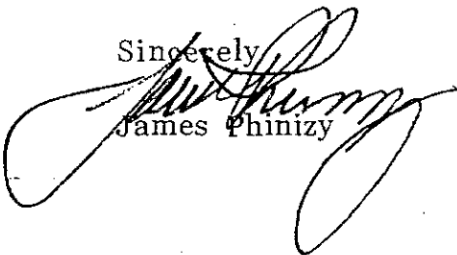
- 2) that the facility be required to install continuous emissions monitoring devices ("cems") to monitor the major pollutants and emissions, including but not limited to nitrogen oxide, cadmium, lead, mercury, sulfur dioxide, and dioxin, and that the cost of these monitors be shared by the entire state and not just the "waste project" communities. At present, 25%-50% of the facility's monthly capacity comes from the 'spot' market, in short trash generated by non member towns. It is only reasonable that the other municipalities in the state which enjoy the use of this facility share these costs.

3) that the same, more strict emission criteria apply to the facility and that the department pursue the most stringent emission standards for both waste combustors.

It also is imperative that your department work with the Sullivan County delegation, Councilor Burton, Councilor Spaulding and the Office of the Governor towards the most sensible way in which this facility may be decommissioned in the shortest time possible.

Thank you in advance for your cooperation in this matter. If you have any further questions, please do not hesitate to contact me. I remain

Sincerely,

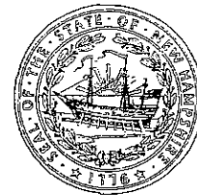

James Phinizy

cc: His Excellency, The Governor
Hon. G. Musler, Chairman House Environment & Agr.
Sen. Johnson, Chairman, Senate Committee on Environment
Hon. R. Burton, Governor's Council
Hon. P. Spaulding, Governor's Council
Sullivan County Delegation
Mr. Gil de Rubio, County Manager, Sullivan Co.
Mr. Santagate, City Manager, Claremont.

Sullivan District 23
Acworth, Charlestown & Langdon



The State of New Hampshire
Department of Environmental Services



Michael P. Nolin
Commissioner

FINDINGS OF FACT AND DIRECTOR'S DECISION

**In the Matter of the Issuance of a Title V Operating Permit To
Wheelabrator Claremont Company, L.P.
Located in Claremont, New Hampshire**

The Clean Air Act Amendments of 1990 (CAAA) established a new federal permit program for the nation's largest emission sources (called "major sources"). The CAAA required states to develop and implement this program consistent with federal regulations. The state rules implementing this operating permit program, commonly called "Title V," took effect in New Hampshire on June 30, 1995. Wheelabrator Claremont Company, L.P., of Claremont, New Hampshire (Wheelabrator Claremont) filed a Title V Operating Permit application on August 6, 1996, with additional information supporting the original application filed on September 11, 2002 and November 1, 2002.

There are typically four phases in the Title V permitting process:

- First, the permit application undergoes an initial review by the New Hampshire Department of Environmental Services, Air Resources Division (DES) to ensure that the information submitted is complete and includes all appropriate regulatory requirements. If so, a "completeness determination" is issued by DES.
- After the application has been deemed administratively complete, DES undertakes an extensive technical review. This includes, but is not limited to, facility site visits and an analysis of historical information. Once DES has completed this review and is confident that the application accurately reflects the facility's operations, DES develops a "draft Title V Operating Permit." The draft Title V Operating Permit contains all applicable regulatory requirements (both state and federal) that pertain to the facility.
- Once the draft Title V Operating Permit is prepared, a notice is published as required by the New Hampshire Code of Administrative Rules, Env-A 206.02 *Public Notice*. The public, the United States Environmental Protection Agency (EPA), and any other interested parties are invited to submit comments on the draft Title V Operating Permit. An opportunity for a public hearing is also provided.
- After all public comments have been received and evaluated by DES, a final determination regarding the permit is made by the Director of the Air Resources Division (Director). If the determination is favorable, the draft Title V Operating Permit is designated as "proposed" and sent to EPA for further review. A draft Title V Operating Permit may be modified as a result of comments received during the public comment period before it is sent to EPA as a proposed permit. If modified, as in this case, a formal document is generated to address the changes made to the draft Title V Operating Permit. This document is called the "Findings of Fact and Director's Decision." The proposed permit is reviewed by EPA for up to forty-five days. If EPA has no objections within this timeframe, the final permit is issued.

Any person aggrieved by the Director's decision can file an appeal within 10 days of issuance of the Proposed Title V Operating Permit with the Air Resources Council in accordance with the provisions of Env-A 206.09, *Permit Notice and Hearing Procedures: Title V Operating Permits – Appeals*, and Env-AC 206, *Appeals Procedures*.

In accordance with 40 CFR 70.8(d), if EPA does not make any objections to the Proposed Title V Operating permit in writing in accordance with 40 CFR 70.8(c), any person may petition the Administrator of the EPA within 60 days after the expiration of the Administrator's 45-day review period. Any such petition shall be based only on objections to the permit that were raised with reasonable specificity during the public comment period, unless the petitioner demonstrates that it was impracticable to raise such objections within such period, or unless the grounds for such objection arose after such period.

Background

Wheelabrator Claremont Company, L.P. (Wheelabrator Claremont) operates a resource recovery facility in Claremont, New Hampshire. The resource recovery facility burns municipal solid waste (MSW) in two combustors that generate steam. The steam drives a turbine generator to produce electricity for sale to the local utility.

The MSW combustors are two identical mass-fired waterwall boilers each with a maximum heat input rate of 43.1 MMBTU/hr. Each unit is equipped with a single auxiliary propane fired burner rated at a maximum of 15 MMBTU/hr. The flue gas runs through pollution control equipment that controls mercury, acid gases, particulate matter and other pollutants. Each boiler stack is equipped with a continuous emissions monitoring system and a continuous opacity monitoring system. The quenched bottom ash is transported via a drag conveyor to an ash handling room. The ash is loaded into containers and stored under cover until it is transported to a landfill.

On August 6, 1996, Wheelabrator filed a Title V Operating Permit application with DES. Additional information supporting the original application was filed on September 11, 2002 and November 1, 2002.

In accordance with Env-A 206, *Permit Notice and Hearing Procedures: Title V Operating Permits*, a notice of request for public comments and opportunity for a public hearing was published in the *Union Leader* on May 21, 2003. In addition a notice was also published in the *Eagle Times* on May 21, 2003. The notice invited public comment and indicated that a public hearing for the draft Title V Operating Permit was scheduled on June 24, 2003 at the Claremont Middle School in Claremont, New Hampshire. The notice also stated that any comments received during the public comment period or at the public hearing would be considered in reaching a final decision. The notice stated that the deadline for written comments was June 24, 2003. During the public hearing for the draft Title V Operating Permit held on June 24, 2003, it was determined by the hearing officer that a continuation of the public hearing was necessary in order to allow all commenters adequate opportunity to provide testimony for consideration in the permitting process.

In accordance with Env-A 206, a notice of continuation of the Title V Operating Permit public hearing was published in the *Union Leader* and the *Eagle Times* on July 9, 2003. The notice informed the public that the public hearing held on June 24, 2003 on the draft Title V Operating Permit was continued to Tuesday, July 29, 2003 at the Claremont Senior Center located at 5 Maple Heights in Claremont, New Hampshire, beginning at 6:00 p.m. As a result the public comment period was also extended until August 8, 2003.

During the public hearing, several citizens offered testimony, comments, and questions regarding the Wheelabrator facility. Written comments were also received at DES prior to the August 8, 2003 deadline.

Discussion

During the public comment period and at the public hearings held on June 24, 2003 and July 29, 2003, many comments were received expressing concern over public health and environmental issues with respect to emissions from the Wheelabrator Claremont facility. Since Wheelabrator Claremont has proposed to install pollution control equipment to further reduce mercury and dioxin/furan emissions to comply with federal and state air regulations, DES is concurrently processing a Temporary Permit to allow the installation, operation and testing of the pollution control equipment. It was determined that processing these applications together would allow the public to have all relevant information with respect to this facility available for review and comments.

With respect to the Title V Operating Permit, all state and federal requirements have been included in the draft permit. These include requirements for current permitted operations (operations consistent with the existing State Operating Permits PO-C-362 & PO-C-363) and requirements that will become effective after the compliance date of the federal/state small municipal waste combustion (MWC) regulations contained in 40 CFR Part 60 Subpart BBBB and the New Hampshire Code of Administrative Rules, Env-A 3300, *Municipal Waste Combustion*. The following discussion provides a detailed description of the proposed pollution control equipment project associated with the draft Temporary Permit and addresses the issues presented at the public hearings and in written correspondence submitted to DES prior to the close of the comment period for the Title V Operating Permit.

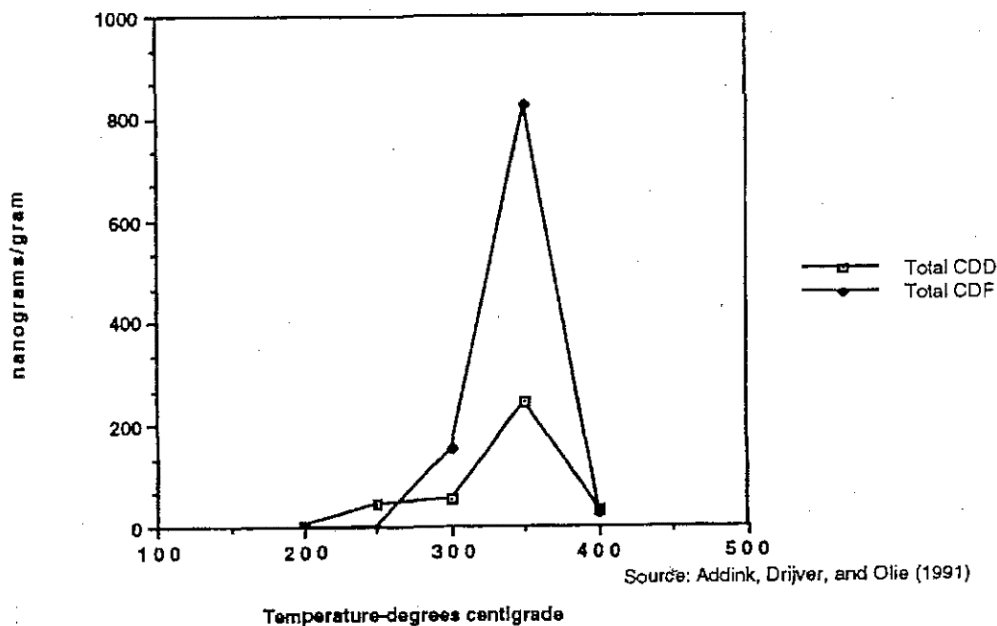
Proposed Project Description Relating to the Temporary Permit Process

As a result of federal and state regulations, Wheelabrator Claremont proposed to install and operate a powdered activated carbon injection system (PACIS), an evaporative cooling system (ECS), and to upgrade the fabric filters from fiberglass bags to Ryton bags. The PACIS and ECS will be used to comply with the new limits for mercury and will further reduce emissions of dioxin/furans. The primary purpose of the PACIS is to reduce mercury emissions. The powdered activated carbon (PAC) will be delivered pneumatically to the economizer outlet duct upstream of the ECS. In order for the PAC to optimally react with the mercury in the exhaust gas a reduction in the flue gas temperature must occur. Wheelabrator Claremont will achieve this reduction in exhaust gas temperature by use of the ECS.

The primary purpose of the ECS is to lower the exhaust gas temperature to produce optimal conditions for the PAC to react with the mercury present in the exhaust gas. The ECS provides additional benefits by rapidly lowering the exhaust gas temperature from the critical temperature range for "de novo"¹ dioxin/furan formation thus reducing dioxin/furan emissions. The ECS works by injecting finely atomized water droplets that evaporate in the high temperature exhaust gases to quickly lower the exhaust gas temperature and raise humidity. The ECS will be installed downstream of the PACIS and upstream of the existing fabric filters. Due to the lowering of the exhaust gas temperature, Wheelabrator Claremont has proposed to replace the existing fiberglass filter bags in the fabric filter with more efficient Ryton bags.

One commenter suggested that the rapid cooling of the exhaust gas would cause greater dioxin/furan formation through the "de novo" process. "De novo" formation refers to the creation of dioxin downstream of high temperature combustion zones, where combustion gases have slowly cooled to temperatures favorable for dioxin formation chemistry. As illustrated in the figure below, optimal dioxin formation occurs at temperatures between 400 - 750 degrees Fahrenheit (200 and 400 degrees Centigrade). The ECS is designed to rapidly reduce the exhaust gas temperature to less than 300 degrees Fahrenheit (150 degrees Centigrade). Consequently, the ECS will quickly reduce the exhaust gas temperatures to a level well below that required for optimal dioxin/furan formation. In fact, researchers suggest that rapid quenching of the exhaust gas through the dioxin reformation temperature "window" is one of the most significant strategies for minimizing "de novo" dioxin formation in combustion processes².

Temperature Effects on CDD/CDF Production



¹ "De novo" formation is the creation of dioxin "downstream" of high temperature combustion zones, when combustion gases have cooled to temperatures favorable for dioxin formation chemistry. *The New Hampshire Dioxin Reduction Strategy, February 2001*

² Gullet, Brian and Seeker, Randy, "Chlorinated Dioxin and Furan Formation, Control and Monitoring," Presented at ICCR Meeting, Research Triangle Park, Sept 17, 1997.

In addition to installing and operating the above mentioned control equipment, Wheelabrator Claremont will continue to inject lime into the exhaust gas. Wheelabrator Claremont has proposed to change this system from a dry-lime injection system to a wet-lime (lime slurry) injection system. The primary purpose of lime injection is to reduce sulfur dioxide and acid gas emissions. Under current conditions, the dry lime is injected into the exhaust gas after the spark arrestors. Because the PACIS and ECS will be installed in place of the spark arrestors, the lime will be injected into the exhaust gas after the PACIS and before the ECS. Under these conditions, the exhaust gas will be at a higher temperature during lime injection. Due to the higher temperatures, Wheelabrator Claremont has proposed using a lime slurry injection to prevent any corrosive conditions from occurring at the lime injection point. The wet-lime system will act essentially in the same way as the dry-lime injection system.

As previously stated, Wheelabrator Claremont proposed installing the above mentioned pollution control equipment as a means to comply with federal and state air regulations. The EPA developed emission guidelines for existing small Municipal Waste Combustion (MWC) units (40 CFR Part 60, Subpart BBBB) in accordance with sections 111(d) and 129 of the Clean Air Act. DES adopted rules and submitted a state plan to EPA implementing the emission guidelines contained in the federal regulation. Env-A 3300, *Municipal Waste Combustion*, was adopted on June 7, 2002. The state plan was submitted to EPA on August 16, 2002 and was federally approved on February 10, 2003. The rule became effective (i.e., federally enforceable) on April 11, 2003. Wheelabrator is required to meet the applicable emission limitations specified in Env-A 3300 by April 11, 2004, unless an approved final control plan was submitted by October 11, 2003. Final compliance with the emission limitations must be achieved by December 6, 2005. On October 10, 2003, Wheelabrator Claremont submitted an approved Final Control Plan with a final compliance date of December 6, 2005.

Below is a comparison of the applicable requirements prior to and after the compliance date set forth in Env-A 3300. Based on similar technology installed and tested at the Wheelabrator Concord facility, DES expects to see an overall reduction in mercury emissions of 90% or greater, and overall reduction in dioxin/furan emissions of 80% or greater.

Table 1: Emission Limitations Prior to and After the Final Compliance Date Set Forth in Env-A 3300				
Pollutant	Emission Limit (Prior to Compliance Date)	Regulatory Basis	Emission Limit (After the Compliance Date)	Regulatory Basis
Nitrogen Oxides (NO _x)	0.53 lb/MMBTU	Env-A 1211.09	0.53 lb/MMBTU	Env-A 1211.09
Particulate Matter (PM)	0.02 gr/dscf at 12% CO ₂ (1.87 lb/hr) ³	PO-C-362 & PO-C-363	0.02 gr/dscf at 12% CO ₂ (1.87 lb/hr) ³	PO-C-362 & PO-C-363
Sulfur Dioxide (SO ₂)	26.5 lb/hr	PO-C-362 & PO-C-363	77 ppmdv, or 50% of the potential SO ₂ emission concentration	Env-A 3303.02(a)
Carbon Monoxide (CO)	<ul style="list-style-type: none">12 lb/hr (3-hr rolling average) @ 7% O₂100 ppmdv @ 7% O₂ (4-day rolling average)400 ppmdv @ 7% O₂ (8-hr rolling average)	PO-C-362 & PO-C-363	100 ppmdv (4-hr block averages, arithmetic mean)	Env-A 3303.02 (a)

³ This limit is more stringent than the limit imposed by Env-A 3300 (70 mg/dscm @ 7% O₂)

Hydrogen Chloride (HCL)	50 ppm _{dv} @ 7% O ₂ or 90% removal efficiency ⁴	Env-A 1904.05	50 ppm _{dv} @ 7% O ₂ or 90% removal efficiency ⁴	Env-A 1904.05
Lead (Pb)	Compliance with the N.H. Air Toxics Regulation	Env-A 1400	1.6 mg/dscm (3-hr average)	Env-A 3303.02(b)
Mercury (Hg)	Compliance with N.H. Air Toxics Regulation	Env-A 1400	0.028 mg/dscm or 85% control efficiency (3-hr average)	Env-A 3303.02(b) & RSA 125-M
Cadmium (Cd)	Compliance with N.H. Air Toxics Regulation	Env-A 1400	0.1 mg/dscm (3-hr average)	Env-A 3303.02(b)
Dioxins/ Furans	2,3,7,8 Tetrachlorodibenzo-p-dioxin (TCDD) – 3.4 e-07 lb/hr	PO-C-362 & PO-C-363	125 ng/dscm (total mass) (3-hr average w/ minimum run duration is 4 hours)	Env-A 3303.02(b)
	2,3,7,8 Tetrachlorodibenzo-p-furan (TCDF) – 4.75 e-06 lb/hr			
Fugitive Ash	No Limit Specified	N/A	Visible emissions for no more than 5% of hourly observation period	Env-A 3303.02(b)
Opacity	20% (based on 6 minute averages)	Env-A 1903.01(a)	10% Consecutive 6-minute block period in any 60 minute period	Env-A 3300

Lb/MMBTU – pounds per million British Thermal Units

Lb/hr – Pounds per hour

ppm_{dv} – Parts per million dry volume

gr/dscm – grains per dry standard cubic meter

mg/dscm – milligrams per dry standard cubic meter

ng/dscm – nanograms per dry standard cubic meter

PO-C-362 & PO-C-363 – Wheelabrator Claremont State Operating Permits

Title V Operating Permit

As stated previously, the CAAA of 1990 established a new federal permit program for the nation's largest emission sources (called "major sources"). The EPA developed regulations codified in 40 CFR Part 70 requiring states to develop permit programs (New Hampshire Code of Administrative Rules, Env-A 609, *Title V Operating Permits*) consistent with federal regulations. New Hampshire's Title V Permitting Program took effect on June 30, 1995. Wheelabrator Claremont is subject to this program because it is considered a major source of air emissions as defined in New Hampshire Code of Administrative Rules, Env-A 101.168.

The draft Title V Operating Permit contains operating and emissions limitations for all applicable requirements including those required in the draft Temporary Permit. In addition, the draft Title V Operating Permit contains specific recordkeeping and reporting requirements consistent with the federal requirements specified in 40 CFR Part 70.

Upon EPA approval, Title V Operating Permits are issued for a period of 5 years. As a requirement of the Title V Operating Permit Program, during the permit term, sources must certify compliance with the terms and conditions of the Title V Operating Permit annually. In addition, sources must submit semi-annual permit deviation and monitoring reports.

⁴ This limit is more stringent than the limit imposed by Env-A 3300 (250 ppm_{dv} or 50% removal efficiency)

Facility Compliance Status and History

As part of the technical analysis of the application, DES reviews the compliance history of the source with respect to all federal and state air regulations. Many comments were raised, both during the public hearing and in written correspondence submitted to DES, with respect to violations of the carbon monoxide (CO) limits contained in the facility's State Operating Permits (PO-C-362 and PO-C-363).

The State Operating Permits previously issued to Wheelabrator Claremont have various emissions limitations and monitoring requirements for compliance purposes, as summarized in the following table:

Table 2: Emission Limitations and Monitoring Requirements in State Operating Permits			
Pollutant	Emissions Limitation	Monitoring	Frequency
Particulate Matter	0.02 gr/dscf @ 12% CO ₂	Stack Testing	As required by DES
Sulfur Dioxide	26.5 lbs/hr	Stack Testing	As required by DES
Oxides of Nitrogen	0.53 lb/MMBTU	Stack Testing	Every 3 years in accordance with Env-A 1211
Carbon Monoxide	<ul style="list-style-type: none">12 lbs/hr (3-hr rolling average) @ 7% O₂400 ppm_{dv} @ 7% O₂ (8-hr rolling average)⁵100 ppm_{dv} @ 7% O₂ (4-day rolling average)⁵	Continuous Emissions Monitor (Oxygen, CO and Steam Flow)	Continuous monitoring in accordance with Env-A 800
Hydrogen Chloride	50 ppm _{dv} @ 7% O ₂ or 90% removal efficiency	Stack Testing	As required by DES
2,3,7,8 TCDD	3.4 e-07 lb/hr	Stack Testing	As required by DES
2,3,7,8 TCDF	4.75 e-06 lb/hr	Stack Testing	As required by DES
Opacity	20% (based on 6 minute averages)	Continuous Opacity Monitor	Continuous monitoring in accordance with Env-A 800

gr/dscm – grains per dry standard cubic meter

lb/hr – pounds per hour

lb/MMBTU – pounds per million British Thermal Unit

ppm_{dv} – parts per million dry volume

As specified in Table 2 above, the existing permit have three different limits for CO. Each CO limit has a corresponding basis and compliance purpose. DES uses CO to determine the quality of combustion occurring in the incinerators for the dual purpose of ensuring compliance with the CO National Ambient Air Quality Standard set by EPA, and under current operating conditions (prior to the installation of the proposed control equipment) for conditions associated with dioxin/furan formation.

The 3-hour rolling CO standard of 12 pounds per hour (lbs/hr) was established to restrict the facility to its originally proposed maximum CO emissions and in general, to minimize CO emissions from the incinerators. This 3-hour rolling CO standard was not intended to correlate CO emissions to optimal conditions for dioxin/furan formation. This standard was developed

⁵ Based on Dioxin Emission Control Policy, *Guideline for Incinerators and Resource Recovery Facilities* (Approved by NH Air Resources Commission on April 17, 1986).

solely as a CO emission limitation to ensure compliance with the National Ambient Air Quality Standard for CO.

In order to verify compliance with the 3-hour rolling CO standard of 12 lb/hr, the facility operates a continuous emissions monitor (CEM) that measures CO concentration in units of parts per million dry volume ppm_{dv} at 7% oxygen (O₂) and operates a continuous steam flow monitor that measures steam production in units of pounds. Currently the CO limit of 12 lb/hr is estimated by calculating CO ppm_{dv} @ 7% O₂ and steam production rate in accordance with the following table as specified in the facility's existing State Operating Permits, the draft Temporary Permit, and the draft Title V Operating Permit:

Table 3: 3-Hour Rolling Average CO Concentration at Varying Steam Production Rates	
Steam Production (lb/hour) (3 hour rolling average)	CO (ppm _{dv} at 7% O ₂) (3 hour rolling average)
0-18,000	270
19,000	262
20,000	254
21,000	245
22,000	237
23,000	229
24,000	221
25,000	212
26,000	204

Also contained in the State Operating Permits are limits for CO based on an 8-hour rolling average and a 4-day rolling average. These limits were established in accordance with the Department's original 1986 Dioxin Policy⁶ titled *Dioxin Emission Control Policy Guideline for Incinerators and Resource Recovery Facilities*. DES used these limits, which were set at 400 ppm_{dv} at 7% O₂ (8-hour rolling average) and 100 ppm_{dv} at 7% O₂ (4-day rolling average), as a surrogate parameter relating the quality of combustion to dioxin/furan formation. The ideal condition for dioxin/furan formation is during the incomplete combustion of organic materials in the presence of chlorine. Conditions of low oxygen, low combustion temperatures and high CO typically characterize incomplete combustion.

DES has analyzed the operation of the Wheelabrator Claremont facility from 1997 to the present with regard to excess CO emissions. During this period there were 80 3-hour rolling periods of exceedances of the CO concentrations contained in Table 3 out of a total of

⁶ Based on Dioxin Emission Control Policy, *Guideline for Incinerators and Resource Recovery Facilities* (Approved by NH Air Resources Commission on April 17, 1986).

approximately 110,000 total rolling 3-hour periods of operation (0.07%). Of these 80 exceedances, 30% were due to equipment malfunction or circumstances beyond the control of the operator, 29% were due to boiler shutdown, 21% were due to startup of the boilers, and 20% were due to operational difficulties.

The exceedances of the 3-hour rolling limits CO limit did not present a health risk. This has been demonstrated by ambient air dispersion modeling, which show that the CO emissions from this facility are a small percentage of the National Ambient Air Quality Standard for CO. The modeling results for CO show predicted ambient impacts to be 0.1% of the 1-hour standard and 0.09% of the 8-hour standard. In addition, the basis for the 3-hour rolling CO permit condition is not related to dioxin/furan formation.

Even though this standard is not intended to be a surrogate for dioxin/furan emissions, DES reviewed the above-mentioned exceedances for the potential of dioxin/furan formation. More than half of the 3-hour exceedances occurred when waste feed was ceasing and the oxygen concentration indicated normal or greater excess air values; these circumstances occurred either voluntarily through the normal shutdown procedure or as the result of feed chute operational difficulties. Since dioxin/furan formation is a by-product of incomplete combustion of organic material in the waste feed in the presence of chlorine, it is unlikely that dioxin/furans were formed under these circumstances. Analysis of the remaining exceedances shows that only a small number of situations occurred where there was any potential for dioxin/furan formation (poor combustion, low oxygen levels) assuming there was chlorine in the fuel. Potential health effects from dioxin/furan are based on "chronic" or long-term exposure rather than "acute" or short-term exposure. This is demonstrated with the 8-hour rolling average and 4-day rolling average CO standard. Review of the data showed that the 3-hour CO standard was exceeded at infrequent times and for short-duration periods. Therefore, the potential for long-term dioxin/furan exposure was negligible. During the 5-year period analyzed for this permit modification, there were only two exceedances of the 8-hour rolling average standard and no exceedances of the 4-day rolling average standard.

In the public hearings, one commenter stated that the Wheelabrator Claremont incinerators experienced a total of 234 CO exceedances during 1987 (facility startup) through 2002. Review of the facility history reveals that a majority of these exceedances occurred during the 1st quarter of 1990 where there were 129 CO exceedances of the 3-hour limit described above. In response to these violations, DES issued an administrative order (ARD-90-012) to Wheelabrator Claremont addressing the problem areas. A compliance plan was implemented as a result of the administrative order and was effective in reducing the number of CO exceedances. Corrective actions included alterations to the plant operating procedures in order to reduce the CO exceedances and the replacement of the existing steam-fed air preheaters with larger more efficient units to improve combustion efficiency and reduce CO.

Review of the stack tests performed over the past 10 years (3 complete comprehensive stack tests and 10 Relative Accuracy Test Audits or RATAs) indicates compliance with all parameters tested including dioxin/furans and carbon monoxide. For the 13 tests that were conducted, a DES representative was on-site during the testing to confirm representative testing and each test was reviewed in detail for technical validity. All the test reports were ultimately

accepted by DES as being technically valid and representing the emissions occurring at the time of the stack test.

DES and EPA performed the following compliance inspections of the Wheelabrator Claremont facility within the past 10-year period. Each inspection revealed the facility was in compliance with the permit in effect.

Table 4: Wheelabrator Claremont Compliance Inspections			
Date	Inspection type	Organization	Findings
3/21/03	EPA Level II	EPA Region I	Facility in compliance
7/24/02	Inspection coinciding with CEM RATA	DES	Facility in compliance
8/13/01	Inspection coinciding with CEM RATA	DES	Facility in compliance
9/14/99	Inspection coinciding with CEM RATA	DES	Facility in compliance
12/22/94	DES Level II	DES	Facility in compliance
10/5/94	EPA Level II	EPA Region I	Facility in compliance
5/12,17/93	DES Level II	DES	Facility in compliance

All of the above inspections, including the most recent inspection conducted by EPA, Region I revealed that the facility was in compliance with applicable standards. As part of the compliance evaluation, the EPA inspector reviewed the compliance history of the facility and determined that the percentage of CO exceedances was within the acceptable range allowed by EPA.

Monitoring and Stack Testing Requirements

Based on the terms and conditions in the previous State Operating Permits, the draft Temporary Permit, and the draft Title V Operating Permit, both incineration units are currently monitored by a CO, oxygen, and opacity continuous emission monitoring system that meets all federal and state regulatory requirements. In addition, Wheelabrator Claremont continuously monitors steam flow rate and combustion temperature via an array of thermocouples located near the combustion zone of each incinerator, and flue gas temperature at the inlet of each baghouse. The pressure drop across each baghouse is also monitored on a daily basis to ensure proper operation.

A comment was raised that the language specified in Table 5a, Item 9.f. of the draft Title V Operating Permit is too vague to determine compliance and provide for enforcement. As a result of this comment, DES has modified the language in Table 5a, Item 9.f. and g. of the draft Title V Operating Permit to read as follows: "Operate a DES approved temperature sensor system that continuously measures and records the combustion zone temperature."

This condition will also be added to Table 5b, Item 9 to require the monitoring of the combustion zone temperature after the compliance date of Env-A 3300. In addition, Table 6b will be modified to reflect this monitoring requirement.

The requirement for combustion zone temperature monitoring came as a result of the DES 1986 Dioxin Emission Control Policy, *Guideline for Incinerators and Resource Recovery Facilities*. This policy ensures for a given waste heat input rate that there is a minimum furnace volume at temperatures equal to or greater than 1500 degrees Fahrenheit and 1800 degrees Fahrenheit. This is determined with formulas developed to calculate the Qualifying Maximum Volumetric Heat Release Rate (QMVHRR) for portions of the combustion zones greater than or equal to 1500 degrees Fahrenheit and greater than or equal to 1800 degrees Fahrenheit.

Testing was completed in 1988 where a temperature profile was established at multiple levels in the combustion zone of the incinerators. As part of this testing, DES approved a testing monitoring system that uses thermocouples placed in the upper combustion zones as a surrogate for temperature measurement in the initial combustion zone. Due to the extreme temperatures in the initial combustion zone, actual measurement within this zone is not practical.

As part of the federal emission guidelines contained in 40 CFR Part 60 Subpart BBBB and the state requirements specified in Env-A 3300, a sulfur dioxide (SO₂) CEM will be installed by December 6, 2005 to continuously measure SO₂ emissions. The SO₂ CEM system is required to meet the same applicable federal and state requirements as the existing CEM equipment following installation. Also, the SO₂ CEM will provide surrogate monitoring for HCL in the flue gas stream.

In order to ensure proper operation of the PACIS and the ECS, a condition has been included in the Temporary Permit and the Title V Operating Permit that requires Wheelabrator Claremont to continuously monitor carbon feed rate into the flue gas stream. The facility is required to establish a relationship (8-hour block average) between carbon feed rate and dioxin/furan and/or mercury emissions during compliance stack tests. Once this value is established, Wheelabrator Claremont is required to maintain the 8-hour block average feed rate at or above the highest average level established during the most recent dioxin/furans or mercury stack test. In addition, a condition has been added to the draft Temporary Permit and the draft Title V Operating Permit to require Wheelabrator Claremont to conduct optimization tests to determine the optimized carbon feed rate of the powdered activated carbon injection system for which the mercury emissions are optimally minimized below the applicable limits.

Along with the CEM requirements listed above, conditions have also been incorporated into the Temporary Permit and the Title V Operating Permit to require an initial and periodic stack tests for particulate matter (PM), hydrochloric acid (HCL), dioxin/furans, lead, cadmium, mercury, opacity and fugitive ash after the final compliance date of the federal emission guidelines. Modifications were made to the Temporary Permit and the Title V Operating Permit to address inconsistencies in the mercury testing requirements between the Wheelabrator Claremont and Wheelabrator Concord permits. The changes include requiring quarterly testing on alternating emissions units each quarter for a period of one year. If the annual average of the quarterly testing is less than or equal to 0.028 mg/dscm or 85% control efficiency, annual testing may be conducted for both units.

DES has considered requiring a NO_x CEM, but has concluded in this case that such a CEM is not a cost effective monitoring tool. NO_x emissions have been shown to be relatively stable at between 0.40 to 0.50 lbs NO_x/mmBTU (NO_x RACT limit is 0.53 lbs/MMBTU). This conclusion is based on review of the 3 NO_x stack tests performed at Claremont in the past 10 years and the Wheelabrator Concord CEM real time data prior to installation of the NO_x Selective Non-catalytic Reduction System (SNCR). DES has determined that the frequency of NO_x emissions stack testing can be increased in both an economical and technically valid manner by requiring NO_x emissions testing during the performance of the annual CEM relative accuracy test audit. This additional annual NO_x testing requirement has been incorporated in the Temporary Permit and Title V Operating Permit.

DES reviewed the feasibility and practicality of installing other monitors suggested by a commenter at the public hearing. In general, DES believes that the benefit of these new technology monitors is not effective in light of high capital and operating costs, early stages of technological development of these monitors, lack of performance specifications written for the monitors, and the low emission rate expected for each of the metal and dioxin/furan compounds after the new controls are installed. Therefore, DES has decided not to require (1) CEMs for mercury or other heavy metals, or (2) a CEM for dioxin/furan. Compliance with the limits for these compounds will be determined through the repeated compliance testing requirements specified in the draft permits. DES is also requiring continuous monitoring of the carbon injection rate and inlet temperature to each baghouse in order to ensure proper removal of mercury. The rate of carbon injection necessary for mercury collection and the appropriate temperature will be established during compliance stack testing.

A comment was received opposing the exemptions from the limits on load level, temperature at the inlet of the baghouse and carbon feed rate during certain described situations contained in Condition VIII.A.5. of the draft Temporary Permit and Condition VIII.C.5. of the draft Title V Operating Permit. The exemption language was incorporated by reference into state rule (Env-A 3300) from the federal emission guideline contained in 40 CFR 60.1690. The intent of these exemptions is to allow the facility to increase the steam rate up to the maximum allowed rate of 29,500 pounds per hour prior to conducting stack testing. There is a condition in the draft Temporary Permit and the draft Title V Operating Permit to limit the steam production rate to a level of 110% above the most recent stack tested level, but not to exceed 29,500 pounds per hour. The exemption from the load level, temperature at the inlet of the baghouse, and carbon feed rate is allowed only during the five situations listed below:

1. During the annual tests for dioxins/furans.
2. During the annual mercury tests (for carbon feed rate only).
3. During the 2 weeks preceding the annual tests for dioxin/furans.
4. During the 2 weeks preceding the annual mercury tests (for carbon feed rate requirements only).
5. Whenever DES permits the facility to do any of the following five activities:
 - a. Evaluate system performance.
 - b. Test new technology or control technologies.
 - c. Perform diagnostic testing.

- d. Perform other activities to improve the performance of the municipal waste combustion unit.
- e. Perform other activities to advance the state of the art for emission controls for the municipal waste combustion unit.

Recognizing public concerns with respect to emissions from this facility, DES has added language to clarify that the exemptions two weeks prior to the annual dioxin/furan and mercury compliance tests (conditions VIII.A.5.c. and VIII.A.5.d. of the draft Temporary Permit, and conditions VIII.C.5.c. and VIII.C.5.d. of the draft Title V Operating Permit) apply only during the five activities listed in condition VIII.A.5.e of the draft Temporary Permit and condition VIII.C.5.e. of the draft Title V Operating Permit (Number 5 listed above), and only after notification to DES by Wheelabrator Claremont. The language in the draft Temporary Permit and draft Title V Operating Permit has been changed as shown below:

1. During the annual tests for dioxins/furans.
2. During the annual mercury tests (for carbon feed rate only).
3. During the 2 weeks preceding the annual tests for dioxin/furans only after DES authorizes the facility to do any of the following five activities specified in condition VIII.A.5.e. below. (*VIII.C.5.e. in the Title V Operating Permit*)
4. During the 2 weeks preceding the annual mercury tests (for carbon feed rate requirements only) only after DES authorizes the facility to do any of the following five activities specified in condition VIII.A.5.e. below. (*VIII.C.5.e. in the Title V Operating Permit*)
5. Whenever DES permits the facility to do any of the following five activities
 - a. Evaluate system performance.
 - b. Test new technology or control technologies.
 - c. Perform diagnostic testing.
 - d. Perform other activities to improve the performance of the municipal waste combustion unit.
 - e. Perform other activities to advance the state of the art for emission controls for the municipal waste combustion unit.
6. The Permittee shall provide notification to DES for approval prior to exercising the exemption under these conditions.

Regulatory Requirements

The Wheelabrator Claremont facility is subject to a variety of both federal and state regulations. When the EPA developed its emission guidelines for existing MWC facilities specified in 40 CFR Part 60 Subpart Cb and 40 CFR Part 60 Subpart BBBB, two distinct categories of sources were established. The categories, defined as "large MWCs" and "small MWCs," are classified based on the total maximum design capacities of the incineration units. Large MWCs are defined as those facilities that have a total maximum design capacity greater than 250 tons of municipal solid waste (MSW) per day. Small MWCs are defined as those facilities that have a total maximum design capacity of 35 to 250 tons per day of MSW. Currently New Hampshire has one large MWC (Wheelabrator facility located in Concord) and one small MWC (Wheelabrator facility located in Claremont).

According to the federal regulations, both large and small MWCs, have corresponding emission limitations for a variety of pollutants. EPA established these emission limitations through the federal rulemaking process. Through sections 111(d) and 129 of the Clean Air Act, states are required to adopt regulations and submit a state plan that is at least as stringent as the federal requirements. New Hampshire adopted its regulation (Env-A 3300) incorporating these requirements in June of 2002 and submitted the state plan to EPA on August 16, 2002. EPA approved New Hampshire's state plan on February 10, 2003 and it became effective on April 11, 2003. Below is a summary of New Hampshire's requirements for large and small MWCs. The only pollutant that has emission limitations more stringent than the federal requirements is mercury. The emission limitations for mercury are consistent with requirements specified in New Hampshire law, RSA 125-M.

Table 5: New Hampshire's MWC Emission Limitations (Env-A 3300)

Pollutant	Large MWC Emissions Limitations	Averaging Time	Small MWC Emissions Limitations	Averaging Time
Nitrogen Oxides	205 ppmv, corrected to 7% O ₂	3-run average	Not Applicable	Not Applicable
Particulate Matter	27 mg/dscm, corrected to 7% O ₂	3-run average	70 mg/dscm, corrected to 7% O ₂	3-run average
Opacity	10 %	6-minute average	10 %	6-minute average
Cadmium	0.04 mg/dscm, corrected to 7% O ₂	3-run average	0.10 mg/dscm, corrected to 7% O ₂	3-run average
Lead	0.44 mg/dscm, corrected to 7% O ₂	3-run average	1.6 mg/dscm, corrected to 7% O ₂	3-run average
Mercury	0.028 mg/dscm, corrected to 7% O ₂ , or 85% control efficiency	3-run average	0.028 mg/dscm, corrected to 7% O ₂ , or 85% control efficiency	3-run average
Sulfur Dioxide	29 ppmv, or 25% of the potential sulfur dioxide emission concentration, correct to 7% O ₂ (dry basis)	24-hour daily block geometric average concentration or percent reduction	77 ppmv, or 50% of the potential sulfur dioxide emission concentration, correct to 7% O ₂ (dry basis)	24-hour daily block geometric average concentration or percent reduction
Hydrogen Chloride	29 ppmv, or 5% of the potential hydrogen chloride emission concentration, correct to 7% O ₂ (dry basis)	3-run average (minimum run duration is 1 hours)	250 ppmv, or 50% of the potential hydrogen chloride emission concentration, correct to 7% O ₂ (dry basis)	3-run average (minimum run duration is 1 hours)
Dioxins/Furans	30 ng/dscm (total mass), corrected to 7% O ₂	3-run average (minimum run duration is 4 hours)	125 ng/dscm (total mass), corrected to 7% O ₂	3-run average (minimum run duration is 4 hours)

mg/dscm - milligrams per dry standard cubic meter

ppmv - parts per million by volume

ng/dscm - nanograms per dry standard cubic meter

During the public hearing and in written comments submitted to DES during the public comment period, a comment was made requesting that DES impose conditions that would require Wheelabrator Claremont to meet the more stringent emission levels specified for the large MWCs. Based on New Hampshire's regulations codified in Env-A 3300, two distinct levels were established based on federal guidelines. The regulations were adopted through the State's rulemaking process. Without a further legislative directive and subsequent rulemaking,

DES does not have the authority to require more stringent emissions standards on the Wheelabrator Claremont facility.

Start-up, Shutdown and Malfunction Exemption

A comment was made with respect to a condition in the draft Temporary Permit and draft Title V Operating Permit that exempts the facility from complying with the new emissions standards during periods of start-up, shutdown and malfunction (S/S/M). The draft Temporary Permit and draft Title V Operating Permit contains a condition (Item 9 of Table 4b in the draft Temporary Permit and Item 4 of Table 5b of the draft Title V Operating Permit), in accordance with the federal requirements of 40 CFR 60.1710, that states that after the final compliance date of the requirements of Env-A 3300, the emissions standards specified in the draft Temporary Permit and draft Title V Operating Permit shall apply at all times except during conditions of S/S/M for a period not to exceed 3 hours.

In previous permits issued to Wheelabrator Claremont, CO emissions were regulated through three different emission limitations. These same limitations are contained in the draft Temporary Permit and the draft Title V Operating Permit for compliance prior to the Env-A 3300 compliance date. As stated previously, each CO limit has a corresponding basis and compliance purpose. DES uses CO to determine the quality of combustion occurring in the incinerators for the purposes of ensuring compliance with the CO National Ambient Air Quality Standard set by EPA and under current operating conditions (prior to the installation of the proposed control equipment), for conditions associated with dioxin/furan formation.

The 3-hour rolling CO standard of 12 pounds per hour (lbs/hr) was established to restrict the facility to its originally proposed maximum CO emissions and to minimize CO emissions from the incinerators in general. This 3-hour rolling standard was not intended to correlate CO emissions to optimal conditions for dioxin/furan formation. This standard was developed solely as a CO emission limitation and not as a surrogate parameter for dioxin/furan emissions.

For the purposes of minimizing dioxin/furan emissions formation, DES established two additional CO limits on an 8-hour rolling average and a 4-day rolling average. The basis for these limits is to act as a surrogate parameter relating the quality of combustion to dioxin/furan formation. At the time these limits were established, DES determined that no exemptions for these limits would be allowed.

With the installation of the PACIS and ECS, there will no longer be a direct correlation between CO and dioxin/furan emissions. The PACIS and the ECS will be operated during all operating periods including S/S/M conditions, which will control mercury and dioxin emissions. Further, during routine S/S/M events, it is difficult to safely minimize CO emissions. Without a S/S/M exemption, operators must employ extreme measures to rapidly bring a device offline in an attempt to avoid an excess CO emission event. These measures, which may include directly extinguishing combustion with water or discharging uncombusted fuel into the ash quench tank, are extremely dangerous and not at all consistent with procedures designed to protect operating personnel and equipment.

Therefore, since mercury and dioxin/furan emissions will be controlled during S/S/M conditions, site-specific impacts are significantly below the National Ambient Air Quality Standard for CO as set by EPA, and extremely unsafe conditions would exist without the exemptions, the S/S/M exemptions will remain in the Temporary Permit and the Title V Operating Permit.

Steam Production Rate Increase

The existing State Operating Permits (PO-C-362 & PO-C-363) limit the steam production rate to 27,500 pounds per hour or the maximum rate established during the most recent emission compliance tests. During the compliance stack test conducted in July of 2000, the steam production rate was maintained at 29,500 pounds per hour at 725 degrees Fahrenheit. The results of the compliance stack test show that Wheelabrator Claremont met all applicable requirements while operating at the higher steam production rate. On January 31, 2002, Wheelabrator Claremont requested to increase the steam production limit to 29,500 pounds per hour. Based on the results of the compliance stack tests, DES has approved the increase in the steam production rate at the facility under the following conditions.

The increase in the steam production rate is authorized provided that Wheelabrator Claremont continues to maintain compliance with all permit terms and conditions and all state and federal requirements. In addition, Wheelabrator Claremont shall not exceed the maximum annual throughput limit of 36,500 tons of MSW per year for each unit.

As stated in the Temporary Permit and the Title V Operating Permit, the steam production rate is capped at a maximum of 29,500 pounds per hour. In addition, a condition exists in the Temporary Permit and the Title V Operating Permit that limits the steam production rate to 110% of the maximum rate during any future compliance stack test, but not to exceed 29,500 pounds per hour.

Prior to granting this approval, DES completed a review of the applicability of the federal New Source Performance Standard (NSPS) for small MWCs and the federal Prevention of Significant Deterioration (PSD) Program. DES determined that the NSPS provisions associated with small MWCs (40 CFR 60 Subpart AAAA) are not applicable because the MWCs were installed prior to the applicability date of the federal NSPS regulation and because the modification (the increase in the steam production rate) does not contribute to a significant emissions increase as defined by this subpart.

The NSPS provisions could apply if an existing facility makes a "modification" as defined in 40 CFR 60.14 (a). According to 40 CFR 60.14 (a), *Modification*, the NSPS provisions are applicable when a modification occurs at a facility for which an NSPS standard applies and for which there is an increase in the potential emission rate. The potential emissions before the modification versus the potential emissions after the modification must be compared. The potential emissions associated with the steam rate increase will not change. Based on conditions contained in the draft Temporary Permit and the draft Title V Operating Permit, the proposed steam rate increase will not cause an increase in any of the existing permit emission limitations and conditions.

In addition, 40 CFR 60.14 (e) (2) states that an increase in the production rate at an existing facility is not considered a modification if the increase can occur without a capital expenditure at the facility. Wheelabrator did install a new economizer in 1991 that potentially could have allowed it to increase the steam production rate of the MWCs at that time. However, in 1991, the NSPS for this type of facility was not in effect. Therefore, the addition of the economizer did not trigger this program. Wheelabrator Claremont did not invest any additional capital to allow for the steam production rate increase to occur. Consequently, the steam production rate increase does not trigger the NSPS provisions.

At the time Wheelabrator Claremont was constructed and the MWCs were installed, the threshold to be considered a major PSD source was 250 tons per year of any criteria pollutant for a municipal incinerator capable of charging less than 250 tons of refuse per day. With the 1990 Clean Air Act Amendments, Section 169 of the Clean Air Act (CAA) was amended to define a "major emitting facility" as follows:

[S]tationary sources of air pollutants which emit, or have the potential to emit, one hundred tons per year or more of any air pollutant from the following types of stationary sources:municipal incinerators capable of charging more than fifty tons of refuse per day.

Therefore, with the 1990 change in the CAA, Wheelabrator Claremont is now considered a major source because it has the potential to emit greater than 100 tons per year (i.e., sulfur dioxide, nitrogen oxides, and carbon monoxide).

Although Wheelabrator Claremont is now considered a major source under the federal PSD program, this proposed increase in the steam production rate will not trigger any applicable requirements since there will be no significant emissions increase as defined by the Clean Air Act. More specifically, the PSD provisions are not applicable because the increase from current actual emissions to future potential emissions is less than the significance levels (i.e., less than 40 tons per year for SO₂ and NO_x and less than 100 tpy for CO).

Ozone Action Days

DES received comments requesting that a condition be added to the permits requiring Wheelabrator Claremont to cease operations for twenty-four hours after DES issues an Air Quality Action Day alert as a result of forecasted ozone levels. In response to this comment, DES provides the following discussion and resulting decision.

DES, in coordination with the New Hampshire Department of Health and Human Services (DHHS), issues an Air Quality Action Day alert whenever air pollution levels in the state are predicted to exceed federal air quality standards and, therefore, reach unhealthy levels. In 2003, a bill (House Bill 613) was introduced into the state legislature requiring shutdown of municipal waste incinerators of a particular capacity on Air Quality Action Days in an effort to reduce the emissions of air pollutants which may exacerbate the problem. At the time this bill was introduced, DES presented testimony to the House Science, Technology and Energy Committee summarized as follows:

The air pollutant that most frequently exceeds federal air quality standards in New Hampshire is ozone. On average, the state experiences ten days per year when the ozone standard is exceeded, based on hourly measurements taken by DES' network of fourteen ozone-monitoring stations. A similar number of Air Quality Action Days are issued each year when DES predicts unhealthy levels of air pollution at any location within the state.

New Hampshire experiences elevated levels of ozone air pollution when winds transport thousands of tons per day of ozone (and compounds which are involved in its production) from out-of-state source areas such as Boston, New York City and the Ohio Valley into the region. The pollutants come from a range of sources that include power plants, automobiles and trucks, and miscellaneous industrial and commercial facilities. New Hampshire sources, especially mobile sources, contribute somewhat to the ozone problem, but emit much less pollution than out-of-state sources located upwind. The following table shows the emissions of in-state sources of two pollutants, nitrogen oxides (NO_x) and volatile organic compounds (VOCs), which combine to produce ozone in the atmosphere.

Table 6: Estimates for New Hampshire Sources (Tons per Day)		
Sources	NO _x	VOCs
Incineration*	1.5	0.005
Mobile Sources	110	64
Utilities (PSNH)	33	0.3
State Totals**	195	216

* Includes Wheelabrator facilities in Concord and Claremont

** Statewide totals include other source categories not listed

DES supports any efforts to measurably reduce the exposure of the general public to harmful air pollutants. However, based on the emissions data, the contribution from the Wheelabrator municipal incinerators is small compared to other sources of pollution. Its impact, therefore, on the region during an Air Quality Action Day is not expected to be significant and would be much less than from these other categories of sources. To this end, DES is continuing to work with EPA and other states to reduce emissions from upwind sources of pollution in an effort to eventually eliminate violations of the federal ozone air quality standard in the northeast. DES believes that, though the closing of the Wheelabrator Claremont incinerator during days when unhealthy air quality is predicted may yield some small benefit, it is unlikely that this action would significantly improve air quality in the immediate area or in the state as a whole.

HB 613 was found to be inexpedient to legislate by the New Hampshire House of Representatives. Therefore, there exists no current legislative authority to require any single source to cease operations during an Air Quality Action Day. Further, as indicated above, DES believes that no additional benefit for the immediate area and the state as a whole would result from such an action.

Public Health Concerns/ Public Health Study

Many of those in attendance at the public hearing and written comments received during the public comment period expressed concern over the potential health impacts of emissions of air pollutants from the Wheelabrator facility on local residents. Several suggested that the Department's air pollution regulations do not adequately protect public health, particularly with

respect to the cumulative impacts from exposure to toxic air pollutants. In particular, many expressed concerns with respect to emissions of mercury and dioxin that may be emitted into the air by the facility at low levels, but can be deposited locally, build up in the environment and result in negative health effects to those exposed. Others expressed concern over the impacts of facility air pollution emissions on the respiratory health of members of the local population. Some have stated that they believe that Claremont-area residents experience higher rates of respiratory disease, cancer and blood lead levels than in other areas of the state, and suggested connections to air pollutant emissions from the Wheelabrator facility. As a result, it requested that prior to DES issuing an air permit, the Department of Health and Human Services (DHHS) undertake a study to examine available statewide health data to ascertain whether significant health disparities exist in the Claremont area that can be attributed to the Wheelabrator facility.

To provide background, the purpose of the New Hampshire Air Toxics Control Program (RSA 125-I) is to "*...promote the public health of the state by reducing exposure to toxic chemicals by regulating releases of toxic chemicals into the ambient air*". The implementing rule (Env-A 1400 – Regulated Toxic Air Pollutants) requires all sources that emit any of the 750+ regulated toxic air pollutants assure that their emissions do not exceed the health-based ambient air limits (AALs) for each pollutant. The AALs are updated annually to assure that they represent the most current scientific human health effects data for each chemical. Consequently, DES is confident that the ambient air impacts of emissions of all regulated toxic air pollutants from the Wheelabrator facility are well below current health-risk based standards, and that the New Hampshire air toxics control program is adequately protective of inhalation risk. In addition, DES has thoroughly examined the impacts of mercury and dioxin emissions from the facility with respect to human health impacts other than through inhalation in both the *New Hampshire Mercury Reduction Strategy* and the *New Hampshire Dioxin Reduction Strategy*. In fact, the *Mercury Reduction Strategy* targeted municipal waste combustors for mercury reduction efforts, and recommended the mercury emission reductions that are being implemented as part of this permit.

With respect to evaluating the cumulative toxic effects of the emissions of multiple pollutants and the long-term accumulation of persistent toxic pollutants, New Hampshire's current air toxics rule (New Hampshire Code of Administrative Rules Env-A 1400) only regulates toxic air pollutants on an individual basis. Many factors contribute to the cumulative impacts of multiple toxic pollutants from a single source. This fact, coupled with exposure to toxic impacts from other sources day in and day out (e.g. off-gassing from home and car materials, gasoline and diesel combustion, pesticide and herbicide exposure, phthalates, etc.), makes cumulative toxic effects essentially impossible to evaluate give the limits of today's science. New Hampshire's air toxics rule (Env-A 1400) is based on inhalation exposure, and does not take into consideration secondary exposures possible for some pollutants such as ingestion of pollutants that bioaccumulate in the food chain. However, as stated above, DES has been addressing emissions and exposure to persistent bioaccumulative toxins (PBTs) on a case-by-case basis. In addition, EPA is beginning to look at ways to objectively and scientifically evaluate and address cumulative exposure.

On September 12, 2003 DES made a formal request to the DHHS Bureau of Environmental and Occupational Health (BEOH) to conduct a health survey in the Claremont area (see letter, attached). DES requested that BEOH provide a description of how the study will be conducted, the deliverables that will be presented to the community at the conclusion of the study, and a timeline for completing the study. DHHS responded to the request on December 2, 2003 with a letter (attached) stating that BEOH has begun the process by conducting a health data screening survey of existing health outcome databases, but additional analysis of the collected information is needed before the data can be fully interpreted. BEOH committed to complete the survey and a full health risk assessment in 2004. Since the initial health screening survey was limited to a preliminary evaluation of the rates of major diseases and health outcomes, DES has no legal justification to deny or delay issuing the permit at this time. However, DES does have the authority under RSA 125-C:13 II (b) to suspend or revoke any temporary or final permit if, after a hearing, the director determines : *"(t)hat emissions from the device to which the permit applies, alone or in conjunction with other sources of the same pollutants, presents an immediate danger to the public health"*. Therefore, DES will have the opportunity to suspend, revoke or modify the permit in the future should the findings of the health risk assessment meet this threshold.

Ambient Air Monitoring

Several comments were made stating that the NH DES air monitoring station in Claremont is inadequate for determining the ambient air impacts of the Wheelabrator facility based on its location, the duration and frequency of sampling, and the pollutants monitored. Consequently, they feel that increased air monitoring is warranted.

The DES air monitoring station located at the intersection of South St. and Broad St. (see attached Claremont overview maps) in Claremont is not intended to assess the ambient air impact of any particular source. Rather its purpose is to evaluate the status of air quality in the Claremont area in relation to National Ambient Air Quality Standards (NAAQS) for ozone and particulate matter. The station is also used to collect ambient air samples for analysis of a variety of regulated toxic air pollutants in order to assess trends in average concentration and population exposure to these pollutants in a typical rural New Hampshire community over time.

Due to issues of cost, complexity, reliability and value associated ambient air monitoring, DES does not as a rule use ambient air monitoring as a tool for determining the impacts of emissions from a particular source. Rather, DES typically relies on a combination of emissions testing, emissions monitoring and air dispersion modeling to conservatively evaluate the potential, "worst-case" ambient air impacts of permitted air pollution sources. In the case of the Wheelabrator Claremont facility, ambient air impacts are conservatively estimated by DES using results from required stack testing and continuous emissions monitoring at the facility together with dispersion modeling as a means of evaluating compliance with applicable state and federal air pollution regulations. The analysis performed by DES concluded that the Wheelabrator Claremont facility is in compliance with all applicable state and federal air pollution requirements.

As part of this permit action, DES considered the feasibility and practicality of requiring that Wheelabrator Claremont install and operate additional ambient air monitoring stations in the Claremont area. The purpose of such monitoring equipment would be to verify, as previously and already determined, the compliance status of Wheelabrator Claremont and to provide additional ambient air quality information in general for the Claremont area. However, isolating and determining ambient air impacts using air monitoring equipment from a single facility, such as Wheelabrator Claremont is a difficult task that may produce questionable data. The Claremont area is subjected to air pollution from a variety of local sources including motor vehicles, industrial and commercial sources, and area sources including home heating and other human activities. In addition, air quality in the Claremont area, like all other parts of the state, is impacted by the transport of air pollution into the state from upwind sources. Therefore, DES has decided not to require Wheelabrator Claremont to install and operate additional ambient air monitoring equipment.

Despite the above determination, DES believes that some additional ambient air monitoring in the Claremont area could be beneficial (from an informational standpoint) for use by the Department of Health and Human Services in its studies of health issues in the Claremont area. To this end, DES is committed to working with interested parties in exploring ways to facilitate, fund and bring about such additional ambient air monitoring. In order to accomplish such a task, DES advocates that a workgroup of interested parties be established to determine the scope and nature of such air monitoring and to secure funding for such a study. DES will solicit involvement in this workgroup from representatives from the Department of Health and Human Services, the City of Claremont, the Solid Waste District, local citizen groups and Wheelabrator Claremont.

Recycling Program/Closure Plans

DES received comments both at the public hearing and in writing about the need for additional recycling opportunities in the Claremont area. It was also suggested that a transition to a recycling-based system could replace incineration. While DES has no regulatory authority to mandate any town to establish a recycling program, or place any recycling requirements on a specific source, DES supports the concept of increased recycling statewide.

In an effort to help better understand the issue related to recycling in the Claremont area and find out what efforts are currently undertaken by the Wheelabrator Claremont facility, DES met with Wheelabrator on October 8, 2003. Through discussions at that meeting and in a subsequent letter from Wheelabrator Claremont dated November 13, 2003 DES understands that Wheelabrator Claremont has undertaken and continues to support recycling activities within the Claremont area. As noted in the letter, some of the activities include: mercury thermometer exchanges, recycling of mercury containing materials, Claremont Earth Day clean up activities and other school sponsored activities, fully funding Claremont Household Hazardous Waste collection days, sponsoring weekly waste disposal and recycling public service announcements, and Wheelabrator Claremont's along with its parent company's involvement in education and assistance in starting recycling programs in local communities.

DES would like to stress the importance of continued promotion of and support for recycling in the Claremont area. DES staff is available to Wheelabrator, the Solid Waste

District, and to individual communities to assist in improving recycling rates. DES requests the assistance of Wheelabrator to further encourage cities and towns within the District to participate in recycling programs such as electronics recycling and to inform of services made available by Wheelabrator such as the payment of membership dues of each participating city or town in the Northeast Resource Recovery Association.

Recycling of specific items not only has socio-economic impacts, but also can effect emissions. These items include: fluorescent light bulbs, electronic waste, batteries, and construction and demolition wastes. Encouraging member towns to divert and/or recycle the previously mentioned items can further reduce emissions of a variety of air pollutants.

Findings of Fact

In response to the application for a Title V Operating Permit, DES conducted a comprehensive review of the proposed project and the compliance history of the facility. In addition, DES considered public comments provided during the public hearing and submitted in writing to DES during the public comment period. Based on its review and considerations, DES determined that Wheelabrator meets all state and federal air regulations including the National Ambient Air Quality Standards for criteria pollutants and the New Hampshire Ambient Air Limits for all regulated toxic air pollutants. This determination was based on emissions rates established for the existing operation (prior to the installation of the PACIS, ECS and Ryton bags), the proposed operation with the installation of the above mentioned pollution control equipment, and the increase in the steam production rate.

In order to ensure compliance with all applicable requirements, various monitoring conditions have been included into the Title V Operating Permit. These include requirements for continuous emissions monitors, periodic compliance stack tests and monitoring of parameters such as carbon feed rate, flue gas temperature at the inlet to each baghouse, pressure drop across each baghouse, and combustion zone temperature.

The past compliance history of the facility was reviewed and DES concluded that the facility has been in compliance with the CO limit over 99.9% of the total operating time since 1997. Although the facility experienced a number of exceedances during the 1st quarter of 1990, DES issued an administrative order (ARD-90-012) addressing the problem areas. As a result of the administrative order, a compliance plan was implemented and was effective in reducing the number of CO exceedances at the facility. In addition, it should be noted that the exceedances described above relate to the 3-hour CO limit which was established solely to minimize CO emissions and is not considered a surrogate parameter for dioxin/furan emissions. An air dispersion modeling analysis conducted for CO emissions indicates that predicted impacts of the CO emissions with respect to the National Ambient Air Quality Standard for CO established by EPA are 0.1% of the 1-hour CO standard and 0.09% of the 8-hour standard.

Many public comments received at the public hearing, as well as written comments received during the public comment period, expressed concern over the potential health impacts on local residents resulting from emissions of air pollutants from the Wheelabrator facility. Several commenters suggested that the Department's air pollution regulations do not adequately protect public health, particularly with respect to toxic air pollutants. In particular, many

expressed concerns with emissions of mercury and dioxin. As a result of these concerns, it was requested that the New Hampshire Department of Health and Human Services (DHHS) undertake a study to examine available statewide health data to ascertain whether significant health disparities exist in the Claremont area that can be attributed to the Wheelabrator facility.

DES is committed to working with the BEOH and other interested parties in exploring ways to facilitate, fund and bring about additional ambient air monitoring in the Claremont area. Based on analyses conducted by both DES and BEOH, no evidence has been presented to date that supports the denial of a Title V Operating Permit to the Wheelabrator Claremont facility.

In summary, after consideration of comments received during the public comment period, DES has made the following changes to the draft Title V Operating Permit.

- DES added a condition requiring Wheelabrator Claremont to conduct optimization tests to determine the optimized carbon feed rate of the powdered activated carbon injection system for which the mercury emissions are optimally minimized below the applicable limits.
- DES added a condition requiring quarterly mercury stack testing, alternating emissions units each quarter, for a period of one year. If the annual average of the quarterly testing is less than or equal to the 0.028 mg/dscm or 85% control efficiency, annual testing may be conducted for both units thereafter.
- DES added a condition which requires annual NOx emissions stack testing during the performance of the annual CEM relative accuracy test audits.
- DES added language to clarify when the exemptions from the load level, temperature at the inlet of the baghouse and carbon feed rate apply and a requirement that Wheelabrator notify DES prior to exercising the exemptions.
- DES clarified language requiring Wheelabrator to operate a DES approved temperature sensor system that continuously measures and records the combustion zone temperature in accordance with the 1986 DES Dioxin Emissions Control Policy. In addition, conditions were added to require this temperature zone monitoring after the final compliance date of the Env-A 3300 regulations.

January 28, 2004

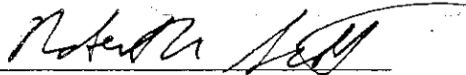
Director's Decision

After consideration of the Title V Operating Permit Application, supplements thereto, and all public comments, the application is approved subject to the revisions to the draft permit noted above, and a Proposed Title V Operating Permit is hereby issued.

Pursuant to New Hampshire Revised Statutes Annotated 125-C:12, III and Env-A 206.09, *Appeals*, any person aggrieved by this action may file a petition for appeal with the Air Resources Council which shall be received within 10 days of the date below. Such appeal and 15 copies shall be filed in accordance with the provisions of Env-AC 200, *Procedural Rules* and forwarded to the Chair of the Air Resources Council at the address below:

Chair of the Air Resources Council
c/o DES, Air Resources Division
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095
ATTN: ARC Council Clerk

If no petition is filed within the 10-day period, this decision will become final.



Robert R. Scott
Director
Air Resources Division

1/29/04

Date

cc: Town of Claremont
Public Hearing Attendees/Public Commenters
James Phinizy, State Representative
Ida Gagnon, USEPA Region 1

Overview of Claremont, NH

City Hall

Wheelabrator

Maximum Impact Area (approximate)

Year of Orthophoto: 1998

0

1

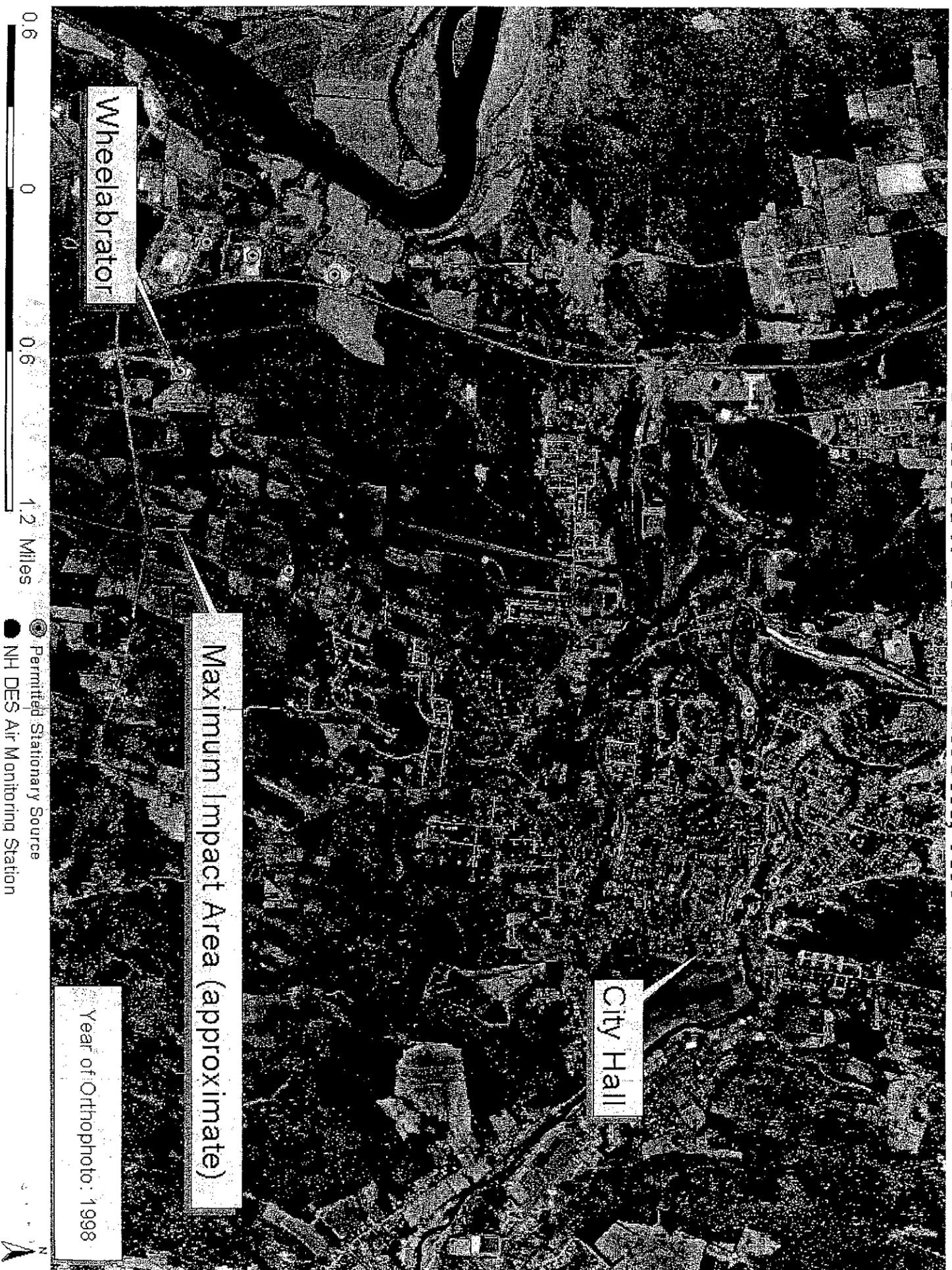
Miles

● School

● NH D-E-S Air Monitoring Station

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Overview of Claremont, NH



***Analysis of Air Emissions
Wheelabrator Claremont Company Incinerator
1987-2002***

**Working on Waste
PO Box 641
Claremont, NH 03743**

**June 2003
(Revised July 2003)**

**Analysis of Air Emissions
Wheelabrator Claremont Company Incinerator, 1987-2002**

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ANALYSIS OF AIR EMISSIONS WHEELABRATOR CLAREMONT COMPANY INCINERATOR 1987-2002

Wheelabrator Claremont Company (Wheelabrator) owns and operates a large "mass-burn" waste incinerator on Grissom Lane in Claremont, near the Charlestown line and Connecticut River. The garbage that is burned in the incinerator comes from Claremont and other New Hampshire communities as well as from out-of-state. The following has occurred since the incinerator went on line in 1987:

- A million tons of waste burned (which is more garbage than Claremont itself would normally produce in 100 years);
- At least 7.5 million pounds (3700 tons) of toxic chemicals emitted from the incinerator smokestack (nitrogen oxides, mercury, dioxin, and more);
- Approximately 350,000 tons of toxic incinerator ash;
- Expensive electricity;
- Barriers to waste reduction and recycling.

This paper addresses economic, environmental and public health concerns associated with the air emissions from Wheelabrator's Claremont incinerator.

INTRODUCTION

Emissions data for the Claremont incinerator were analyzed using reports on file with the New Hampshire Air Resources Division (ARD) within the Department of Environmental Services (DES).¹ The analysis covers a fifteen-year period (1987 to 2002).

Emissions totals for monitored pollutants are shown in Table 1. It is important to note that this should not be considered an inclusive list of chemicals that the Wheelabrator incinerator emits into the air. A 1995 report in *Chemosphere*, for example, "identified 192 volatile organic compounds being emitted by a solid waste incinerator."² Volatile organic compounds are solvents that are used in a variety of products. Styrene, benzene, and toluene, formaldehyde, and methylene chloride are examples of organic solvents.³ Solvents harm the reproductive system and can cause birth defects.⁴

¹ See Air Resources Division (ARD) file for information regarding stack testing conducted by Almega (1987), Entropy (1987, 1993, 1995, 1998) and Deeco (2000). Also see:

- Emission Based Fees Invoice, 1994-2001 for Wheelabrator Claremont Company, LP. The invoice is prepared by ARD;
- Excess Emissions Reports, 1987-2003. Wheelabrator files these reports with ARD on a quarterly basis. The reports concern permit conditions for carbon monoxide, opacity, and steam rate.

² Jay, K. and Steiglitz, L. (1995). *Identification and Quantification of Volatile Organic Compounds in Emissions of Waste Incineration Plants*. *Chemosphere*. Vol. 30, No. 7, pages 1249-1260. Cited in *Environment and Health Weekly* #592, P. Montague, Ed., April 2, 1998. Environmental Research Foundation: Annapolis, MD

³ Schettler, T., Solomon, G., Valenti, M., & Huddle, A. (1999). *Generations At Risk: Reproductive Health and the Environment*. The MIT Press: Cambridge, MA. p. 74.

⁴ Schettler, et. al. (1999), *Ibid.*, p. 83.

TABLE I WHEELABRATOR CLAREMONT COMPANY INCINERATOR EMISSIONS 1987-2002 (15 YEARS)

		TOT TONS	Tot pounds	Notes (16)	
PM	Particulate matter	67.7	135,376.4	(1)	
SO ₂	Sulfur dioxide	644.6	1,289,204.7	(1)	
NO _x	Nitrous oxides	2,638.4	5,276,832.3	(2)	
CO	Carbon monoxide	83.7	167,346.5	(3)	
NMH	Non methane hydrocarbons	3.6	7,245.6	(4)	
HCl	Hydrochloric acid	300.4	600,767.0	(5)	
HAPS/TAPS		319.6	639,214.3	(6)	
DIOXINS/FURANS					
PCDD/PCDF		1.86E-04	3.71E-01	(7)	
TCCD/TCDF		4.43E-05	8.87E-02	(7)	
ACIDS					
H ₂ SO ₄	Sulfuric acid	48.8	97,500.0	(10)(13)	
HF	Hydrogen fluoride	1.4	2,760.0	(10)(13)	
OTHER COMPOUNDS					
VOC	Volatile organics	25.6	51,171.4	(14)	
PAH	Poly aromatic hydrocarbons	9.57E-03	19.14	(10)(13)	
PCB	Poly chlorinated biphenyl's	9.29E-06	1.86E-02	(10)(13)	
METALS & OTHER INORGANICS					
Pb	Lead	1.54E-01	308.8		(D)
Ni	Nickel	3.71E-01	742.4	(8)	(G)
Cr	Chromium	8.95E-03	17.9	(9)	(C)
Cd	Cadmium	1.97E-02	39.3	(9)	(B)
Hg	Mercury	1.60E+00	3,197.9	(9)	(F)
As	Arsenic	6.42E-03	12.8		
Co	Cobalt	2.10E-02	42.0	(10)	
Mn	Manganese	3.30E-01	660.0	(10)	(E)
Cu	Copper	7.93E-02	158.5	(11)	
Zn	Zinc	8.13E-01	1,626.7	(11)	(H)
Be	Beryllium	3.00E-04	0.6	(12)	(A)
Se	Selenium	3.00E-03	6.0	(12)	
	TOTALS	3,738.4	7,476,772.4	(15)	

(1) Values for 1987-1992 are assumed identical to 1993. These values are conservative. A report of John T. Dowd, VP SES Claremont Co., LP shows emissions equivalent to 15 t/y PM and 135 t/y SO₂

(2) Values extrapolated for 1987-1992 by regression on data for 1993-2001

(3) Reason to believe that data for 1993 to 1999 are under-reported (no data available for 1988 to 1992). The 1987 data shows emissions of about 19 tons, similar to what was reported for 2000 and 2001. However the totals shown here are based upon an average of the lower rates of emission from 1993-1999. The total could be higher by about 100 tons

(4) Estimates based upon average values for years 1998-2001

(5) Values for 1987-1992 and 1996-1997 extrapolated from linear regression on data for other years

(6) Estimates for 1987-1993 and 2000-2001 extrapolated from regression on data for other years

(7) Values for 1987-1992, 1996-1997 and 1999-2001 extrapolated from regression on data for other years

(8) Total based on average value for years 1993-1995 and 1998-2001 - no discernible trend

(9) Values for 1987-1992 and 1996-1997 extrapolated from regression on data for other years

(10) Based upon extrapolation of 1993 data, the only year for which information available

(11) Estimates for 1987-1993 and 1996-1997 extrapolated from regression on data for other years

(12) Total emissions estimated from average of data for 1994 and 1995

(13) These compounds are included in the EPA-designated Hazardous/Toxic Air Pollutants. Values for 1987-1992 and 2000-2001 extrapolated from regression on data for other years

(14) Values for 1987-1992 and 2000-2001 extrapolated from regression on data for other years

(15) This sum includes the invoice (emissions fee) values: PM, SO₂, NO_x, CO, Non-methane hydrocarbons (NMH), and HCl

(16) Letters refer the corresponding description of health impacts in Table II, Qualitative Health Effects of Metals

SPECIAL CONSIDERATIONS

Reported carbon monoxide (CO) emissions for 1987 total approximately 18 tons per year. However, for 1993 through 1999, emissions were reported at an average of about 2 tons per year. For the years 2000 and 2001, the reported emissions total about 19 tons per year.

Estimates for missing data are based upon an average of the lower reported emissions for 1993-1999 (approximately 2 tons per year). However, considering the much higher rate for 1987, it is possible that this estimate considerably understates CO emissions.

Emission estimates are based partly upon pollutants listed in the Emission Based Fees Invoice prepared by ARD.⁵ These include particulate matter (PM), SO₂, NO_x, CO, TCDD/TCDF (dioxins), and HAPS/TAPS (hazardous air pollutants and toxic air pollutants). There are variances between the annual data estimates and those provided by the invoice fee statements. The variances approximately cancel each other, but this may be only coincidental.

Estimates were developed for those periods where information for a particular pollutant was unavailable. This was done by using statistical regression on available data and by extrapolating and interloping to obtain estimates for the missing time periods. Where pollution data were insufficient to discern a trend, the average value of data for the years was assumed to prevail for the entire span of fifteen years.

CUMULATIVE AND SYNERGISTIC IMPACTS IN NEW HAMPSHIRE

Cumulative and synergistic impacts of airborne pollutants from the Wheelabrator incinerator in Claremont are a major public health concern. Dioxin and metals, for example, build up in the environment and in the human body and cause harm in low doses. The prestigious International Joint Commission (IJC), after extensive research, concluded that these persistent toxic substances "are too dangerous to the biosphere and to humans to permit their release in any quantity."⁶

In 1995, the New Hampshire Fish and Game Department advised DES to assess cumulative impacts related to dioxin and mercury emissions from the Claremont incinerator. Fish and Game expressed its concern "with the cumulative impacts of dioxins in fish and wildlife as a result of small, permitted emission discharges from the plant."⁷

⁵ ARD File, op cit

⁶ International Joint Commission (IJC). (1994). Seventh Biennial Report on Great Lakes Water Quality. IJC: Toronto, p. 7

⁷ State of New Hampshire Fish and Game Department. (June 20, 1995). Letter from James J. DiStefano, Executive Director, to Kenneth A. Colburn, Director, Air Resources Division, New Hampshire Department of Environmental Services. Concord, NH.

Also in 1995 Wheelabrator sought renewal of the air permits for the Claremont incinerator. At this time, ARD and the New Hampshire Department of Health and Human Services (DHHS) took preliminary steps to conduct an assessment of the public health impacts associated with incinerator pollution.⁸ A full health assessment never materialized, however, perhaps partly due to pressure exerted by Wheelabrator. A June 19, 1995 memo from Wheelabrator to the ARD Director comments on the Director's decision to delay a decision on permit renewal pending an assessment of incinerator impacts. The memo states that such action is "unlawful" and "unfair" and that it discriminates against Wheelabrator.⁹ Amid strong public opposition, ARD renewed the air permits. Wheelabrator is now seeking a Title V air permit because the Claremont incinerator is considered a major pollution source under federal law.

How multiple pollutants react with each other and how the combination affects human health are also of major importance. Multiple chemical exposures "often interact to magnify damaging effects or cause new types of harm."¹⁰ In 2002, DES acknowledged that it "has no basis upon which to evaluate the synergistic effects of the emissions of multiple pollutants."¹¹

HEALTH IMPACTS

The National Association of Physicians for the Environment (NAPE) has stated that "air pollution is a serious public health problem" that "can affect virtually every organ and system of the body."¹² In its comments on the six pollutants regulated under the Clean Air Act of 1970, NAPE reports that "control of these pollutants means keeping their

⁸ See for example:

- o State of New Hampshire. (June 16, 1995). Inter-Department Communication from John J. Dreisig, MPH, to Kenneth Boivin, DES, ARD.
- o State of New Hampshire. (July 13, 1995). Inter-Department Communication from John J. Dreisig, MPH, to Kenneth Stern, Chief Engineer, Division of Water Resources
- o State of New Hampshire. (August 22, 1995). Inter-Department Communication from Brooke S. Dupee, Administrator, Bureau of Health Risk Assessment, to Kenneth Colburn, Director, ARD/DES.
- o NHDES, ARD. (September 7, 1995). Testimony of Kenneth Boivin, Air Pollution Control Engineer, Open Public Meeting.
- o State of New Hampshire. (March 22, 1996). Inter-office Memorandum from John Dreisig and Todd Kennedy, DHHS, to Jeremy Ladd and Jim Black, DES/ARD.
- o State of New Hampshire. (April 26, 1996). Interoffice Communication from John J. Dreisig, MPH and Todd Kennedy, PhD, to Jim Black and Jeremy Ladd, DES/ARD.

⁹ Memo from Gail M. Lynch, Esq., Wheelabrator Environmental Systems, to Ken Colburn, Director, ARD. June 19, 1995.

¹⁰ Schettler, T., Stein, J., Reich, F., & Valenti, M. (2000). In Harm's Way: Toxic Threats to Child Development. Greater Boston Physicians for Social Responsibility: Boston, MA. p. 6.

¹¹ New Hampshire Department of Environmental Services (DES), Air Resources Division. (March 15, 2002). Letter from Kenneth A. Colburn, Director ARD, Response to Public Comments, Temporary Permit for Wood-Fired Process Burner and Rotary Dryer, Catamount Pellet, Claremont, NH.

¹² National Association of Physicians for the Environment. (September 20, 1995). News Release. NAPE: Bethesda, MD.

average air content under relatively arbitrary values, without sound medical studies to support the lack of adverse health effects at these levels.”¹³

Most studies of health impacts on populations living in the vicinity of an MSW incinerator have focused on the incidence of cancer or respiratory symptoms. Some research has covered birth defects and changes in the sex ratio. A recent study from the United Kingdom¹⁴ noted an increased risk of lethal congenital anomaly, in particular spina bifida and heart defects, around incinerators.

Some substances emitted from incinerator stacks, such as cadmium, poly-aromatic hydrocarbons (PAH) and dioxin, have been classified as human carcinogens (cancer-causing substances) or likely/possible carcinogens by the International Agency for Research on Cancer [IARC].¹⁵

Polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) are a group of chemicals often referred to simply as dioxins. There are more than 200 individual congeners (members) of the PCDD/Fs group. The most widely known and most toxic congener is 2,3,7,8-TCDD.¹⁶ On January 19, 2001, the U.S. Department of Health and Human Services, National Toxicology Program, listed 2,3,7,8-TCDD as a known human carcinogen.¹⁷ Waste incineration creates dioxin.

Wheelabrator emission data indicate that the following toxic chemicals are among those emitted in the smokestack plume:

- Hydrochloric acid (HCl)
- Volatile organic compounds (VOC)
- Hydrogen fluoride (HF)
- Sulfur dioxide (SO₂)
- Oxides of nitrogen (NO_x)
- Polyaromatic hydrocarbons (PAH)
- Polychlorinated biphenyls (PCB), dioxins, furans
- Non-methane hydrocarbons
- Metals and compounds: arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, zinc

¹³ National Association of Physicians for the Environment (NAPE). (September 1995). Summary – National Conference on Air Pollution Impacts on Body Organs and Systems. NAPE: Bethesda, MD. p. 3. The six pollutants are sulfur dioxide, carbon monoxide, lead, ozone, particulates, and nitrogen oxide.

¹⁴ Dummer, T., Dickinson, H., & Parker, L. (2003). Adverse Pregnancy Outcomes Around Incinerators and Crematoriums in Cumbria, Northwest England, 1956-93. Journal of Epidemiology and Community Health. 57:456-461. BMJ Publishing Group.

¹⁵ Allsopp, Michelle, Costner, Pat, and Johnston, Paul. (March 2001). Incineration and Human Health. Greenpeace Research Laboratories, University of Exeter, UK. P. 72 (citing McGregor, D.; Partensky, C., Wilbourn, J., & Rice, J. (1998). An IARC Evaluation of Polychlorinated Dibenzo-*p*-dioxins and Polychlorinated Dibenzofurans As Risk Factors in Human Carcinogenesis. Environmental Health Perspectives. 106 (suppl. 2). pp. 755-760).

¹⁶ Allsopp et. al., op. cit., p. 43.

¹⁷ DES. (2001). The New Hampshire Dioxin Reduction Strategy. DES: Concord, NH. p. 11.

Solid, liquid and gaseous emissions from the incinerator have long-lasting effects. Some of the emissions are persistent toxic substances that find their way up the food chain and are ultimately consumed in the human diet. Others, such as NO_x and SO₂, interact with atmospheric gases to create smog.

The enclosed map¹⁸ shows that some parts of Claremont (e.g., Bible Hill area) are disproportionately impacted by incinerator emissions.

PERSISTENT TOXIC SUBSTANCES: Metals, Dioxins/Furans, and PCBs

Airborne emissions from the Claremont incinerator include persistent toxic substances such as dioxin and metals. There is rising concern nationally and internationally regarding the continued dispersal of these persistent chemicals into the environment, a situation that can best be described as "toxic loading."

Metals

Metals do not break down once dispersed into the environment. Exposure to metals can affect all body systems, as seen in Table II.

Table II Qualitative Health Effects of Metals¹⁹

	METAL	HEALTH IMPACTS
A	Beryllium	Pneumonia-like symptoms, scarring of lungs, lung cancer
B	Cadmium	Chronic lung disease, kidney dysfunction, lung cancer
C	Chromium	Skin ulcers, perforation of nasal septum, lung cancer
D	Lead	Deficits in childhood IQ, reduced childhood growth, low birth weight, blood effects, high blood pressure, damage to kidneys and reproductive organs (See further discussion below.)
E	Manganese	Central nervous system disorders
F	Mercury	Acute bronchitis and pneumonia, kidney damage, central nervous system effects, delayed development (See further discussion below.)
G	Nickel	Respiratory system carcinogen, allergic skin reaction
H	Zinc	Digestive system disorders, neurological effects

Metals are widely used in common products. For example, cadmium may be present in batteries, pigments, metal coatings, and plastics.²⁰ Lead can be found in batteries, medical equipment, ceramic glazes, computers, and pigments,²¹ and lead, cadmium,

¹⁸ DES. (attached to correspondence dated April 12, 2000). Modeled Distribution of Maximum Annual Impacts from the Wheelabrator Facility (Map). DES: Concord, NH.

¹⁹ Goyer, R.A. Toxic Effects of Metals. (1986). Casarett and Doull's Toxicology-The Basic Science of Poison. 3rd Edition. MacMillan Publishing Co., New York

²⁰ US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry. (1996). Toxicological Profile for Cadmium. Prepared by Research Triangle Institute Under Contract No. 205-93-0606.

²¹ US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry. (1996). Toxicological Profile for Lead. Prepared by Research Triangle Institute Under Contract No. 205-93-0606.

chromium, and zinc can be present in vinyl and leather products.²² Mercury can be a component of many different products, including fluorescent lamps, thermometers, batteries, and older paints.²³

The Environmental Defense Fund, in a report regarding incineration and public health,²⁴ states that “the process of incineration is uniquely unsuited” for managing the metals that are present in the incoming stream of municipal solid waste (MSW):

Incineration essentially destroys the bulky matrix—paper, plastic, or other materials—which contains metals in MSW and which acts to retard their entrance and dispersal into the environment...In this respect, incinerators can be compared to secondary metal smelters; by burning combustible materials they release metals, which are subsequently mobilized in air emissions or concentrated in the residues in highly bioavailable form. (page 12)

The increased bioavailability arises “from several phenomena” that are associated with the incineration process (pages 12 and 13):

- Toxic metals are volatilized and then condensed onto the surface of fly ash particles, with their concentration increasing with decreasing particle size;
- A large fraction of these particles—whether they exit the stack or are captured by particle control devices—are of respirable size (less than 10 microns in diameter) and can be easily ingested. Their small size promotes short- and long-range dispersal into the environment;
- Metals can leach from particles, sometimes at levels that exceed federal standards defining a hazardous waste;
- Metals can also be released as fumes. Several metals, in particular mercury, are largely in vapor form and escape from the smokestack.

Other stack emissions of metals:

The following metal compounds are not included in the WCC emissions reports but are identified as incinerator stack emissions by the JSI Center for Environmental Health Studies.²⁵

Antimony:	Cardiovascular, lung, reproductive, and developmental effects
Tin:	Pulmonary effects
Vanadium:	Bronchitis and pneumonia-like symptoms

²² Abraham, J., Basford, T., Burnett, B., & Hunt, A. (October 1997). Lead and Other Metals in Play Kit and Craft Items Composed of Vinyl and Leather. *American Journal of Public Health*. Vol. 87, No. 10., pages 1274-1276.

²³ New Hampshire Department of Health and Human Services (DHHS), Bureau of Health Risk Assessment. (2000). *Fish Consumption Advisory*. DHHS: Concord, NH.

²⁴ Denison, R. and Silbergeld, E. (1988-publication date for book). *Risks of Municipal Solid Waste Incineration: An Environmental Perspective*. Environmental Defense Fund Washington, DC

²⁵ JSI Center for Environmental Health Studies (JSI). (1994). *Review of June 15-18, 1993 Stationary Source Sampling Performed on Wheelabrator Claremont Company, LP Facility, Claremont, NH*. JSI: Boston, MA., p. 6.

The discussion below highlights mercury and lead, two metals that have been extensively researched by the public health community. General information about these metals is augmented by information specific to Claremont and/or the Wheelabrator incinerator there. This is also true for the discussion regarding dioxin and for the section entitled Respiratory Irritants.

Spotlight on Mercury

Mercury (Hg) is a highly toxic metal that may exist in a number of different chemical forms.²⁶ The National Research Council has estimated that “each year about 60,000 children may be born in the United States with neurological problems that could lead to poor school performance because of mercury exposure in utero.”²⁷ Studies have shown “a significant correlation” between prenatal mercury exposure and impairment in the areas of language, attention, and memory.²⁸ The Wheelabrator incinerator in Claremont is a major source of airborne mercury pollution in New Hampshire.²⁹

Mercury in sediments and water bodies is converted by bacteria to methylmercury, which bioaccumulates as it passes up the food chain. Consequently, “fish consumed by pregnant women or women of reproductive age may be contaminated with methylmercury at levels that pose a threat to the uniquely vulnerable developing brain of the fetus.”³⁰

New Hampshire has joined several other states in issuing advisories regarding mercury-contaminated fish. DHHS has established the following consumption guidelines for freshwater fish:

- ✓ Pregnant and nursing women and women who may get pregnant: One 8-ounce meal per month;
- ✓ Children under age seven: One 3-ounce meal per month;
- ✓ All other adults and children age seven and older: Four 8-ounce meals per month.³¹

DHHS has also warned that three water bodies in New Hampshire “require more restrictive advice” regarding fish consumption.”³² DHHS “advises everyone to avoid eating all bass and pickerel from May Pond and Ashuelot Pond in Washington, and

²⁶ Schettler, T., Stein, J., Reich, F., Valenti, M. & Wallinga, D. (2000): In Harm's Way: Toxic Threats to Child Development. Greater Boston Physicians for Social Responsibility: Boston, MA. p. 61.

²⁷ The National Academies (NAS). (July 11, 2000). Press Release. Washington, DC

²⁸ Schettler et. al. (2000). *Ibid.*, p. 66.

²⁹ DES, Office of the Commissioner. (November 2002). Ash Landfill Study: A Report to the Governor and General Court, Appendix C. DES: Concord, NH.

³⁰ Schettler, et. al., *Ibid.*, p. 64.

³¹ DHHS. (2003). Is It Safe to Eat the Fish? Reminder About Fish Consumption Guidelines. DHHS: Concord, NH. p. 1.

³² DHHS. (2003). *Ibid.*, p. 1.

Crystal Lake in Gilmanton.”³³ Washington is located within a 20-mile radius of Claremont.

The National Wildlife Federation reports that rainwater in New England is highly contaminated with mercury.³⁴ NWF states:

- ✓ In Maine’s Acadia National Park, mercury levels in rain are up to four times as high as the EPA’s aquatic life standard for mercury in surface water;
- ✓ Along the coast of New Hampshire, mercury concentrations in rain are up to four times the EPA aquatic life and wildlife standard;
- ✓ In Quabbin, Massachusetts; Providence, Rhode Island; and Underhill, Vermont the levels of mercury in rain area as high as four times the EPA’s aquatic and wildlife standard.³⁵

A study published in 1998 indicated a strong link between MSW incinerator emissions and mercury levels in people living in the vicinity, levels that increased with decreasing distance from the incinerator (1.5-5 km).³⁶ “The results indicated that the incinerator was the likely source of exposure among residents...most likely due to inhalation and possibly via ingestion of local well water and vegetables.”

Mercury that escapes from the incinerator stack can travel long distances. Even if mercury is captured with air pollution devices, it must be disposed of as part of the fly ash or residual ash, where it can present exposure risks during ash handling, transport and disposal.

In November 2002, DES published a report regarding the mercury that would be added to the ash if the Wheelabrator incinerator in Claremont is retrofitted with equipment that captures mercury.³⁷ The report cites leachate data from other ash landfills to conclude that mercury releases from post-retrofit ash would be in “de minimis” amounts (p. 13).

However, “the true hazard of ash relates to the actual chemical composition of the ash itself, not to that amount that can be solubilized and removed from the particles when exposed to water of other solutions.”³⁸ This is especially true when the landfill cap and liner are compromised. The EPA has stated that “all landfills eventually leak.”³⁹

Even with retrofit equipment, the incinerator in Claremont would still release dangerous amounts of mercury and other toxic chemicals into the air. This is unacceptable.

³³ DHHS, Ibid, p. 1. Washington is located within a 20-mile radius of Claremont.

³⁴ National Wildlife Federation (NWF). (2000). Clean the Rain II: Executive Summary. NWF: Ann Arbor, MI, p.1.

³⁵ NWF, Ibid, p. 1

³⁶ Allsopp et al, op. cit.

³⁷ DES (November 2002), op. cit.

³⁸ Silbergeld, E. Testimony Before the City Council of Philadelphia on the Subject of Municipal Waste Incineration. (January 28, 1987). Environmental Defense Fund: Washington, DC, page 13.

³⁹ Montague, P. Ed (December 16, 1992). New Evidence That All landfills Leak. Hazardous Waste News #316. Environmental Research Foundation: Annapolis, MD.

In early June 1997, the New England Governors (NEG) and Eastern Canadian Premiers (ECP) approved a "Resolution Concerning Mercury."⁴⁰ In a letter to Working on Waste (1998),⁴¹ New Hampshire Governor Jeanne Shaheen reports that the NEG and the ECP "were able to agree that virtual elimination of man-made mercury emissions should be our regional goal." The Resolution Concerning Mercury states:

The US and Canada have jointly agreed in the Bilateral Air Quality Agreement, Great Lakes Water Quality Agreement, and Virtual Elimination of Persistent Toxic Substances in the Great Lakes Basin to control transboundary emissions and to cooperate on research and development projects to eliminate toxic substances including mercury.⁴²

The graphics on the following pages describe how mercury cycles in the environment and why present regulations fail to protect the public.

Because of Wheelabrator, residents of Claremont and surrounding communities have already been exposed to above average mercury pollution for 16 years. The damage has been done, and the only way to protect the public's health going forward is to close the incinerator.

See discussion below under RELEVANCE OF LEGAL AND REGULATORY FRAMEWORK FOR INCINERATOR EMISSIONS for additional information about mercury pollution from the Wheelabrator incinerator in Claremont.

Spotlight on Lead

Exposure to lead "produces a variety of adverse health effects in sensitive populations through its impact on different organs and systems."⁴³ The Centers for Disease Control and Prevention has set 10 micrograms of lead per deciliter of blood (ug/dL) as the "level of concern" warranting attention by the health care community.⁴⁴ Bellinger and Rappaport report:

Since *Preventing Lead Poisoning in Young Children* was published in 1991, considerable new data have become available on the developmental and neurobehavioral effects of lead. These new

⁴⁰ Annual Conference of New England Governors and Eastern Canadian Premiers (NEG/ECP). (June 2-4, 1997). Resolution Concerning Mercury. NEG/ECP: Newport, RI.

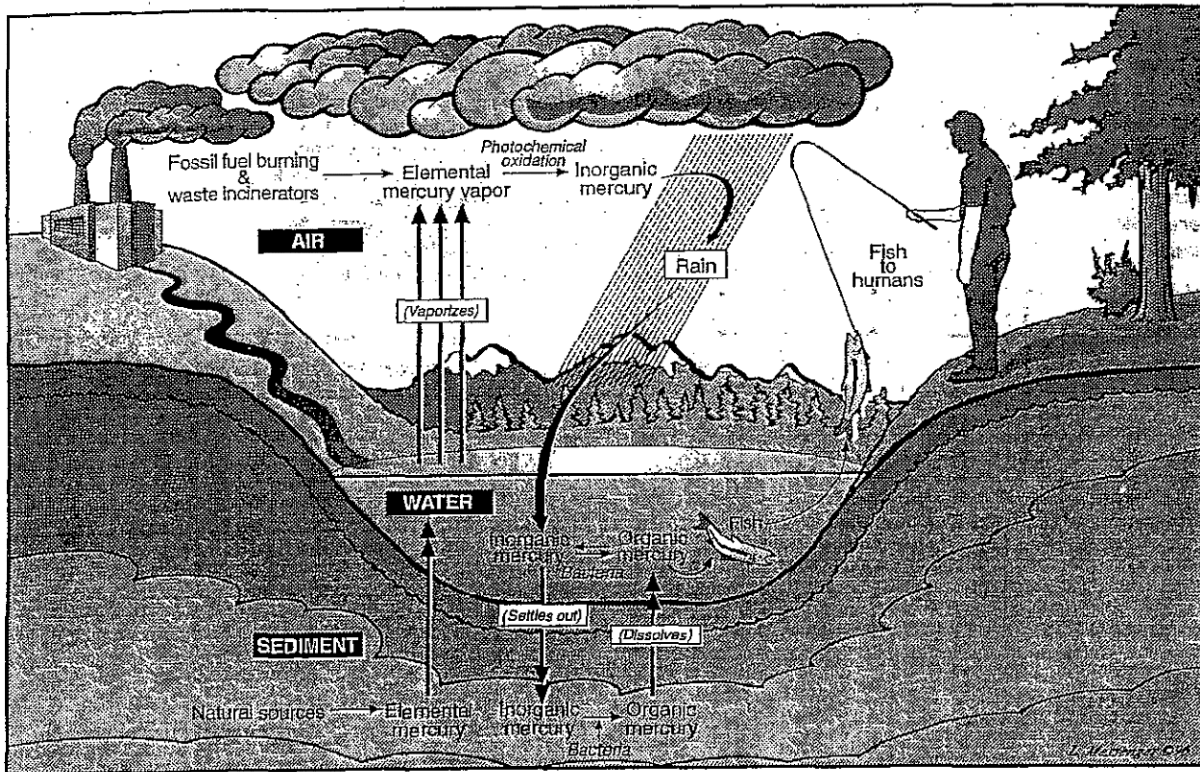
⁴¹ Shaheen, J. (June 18, 1998). Letter to Working on Waste. Office of the Governor: Concord, NH.

⁴² NEG/ECP, op. cit., p. 1.

⁴³ National Research Council. (1993). Measuring Lead Exposure in Infants, Children, and Other Sensitive Populations. National Academy Press: Washington, DC.

⁴⁴ Centers for Disease Control and Prevention. (1991). Preventing Lead Poisoning in Young Children. CDC: Atlanta, GA.

The Cycle of Mercury in the Environment

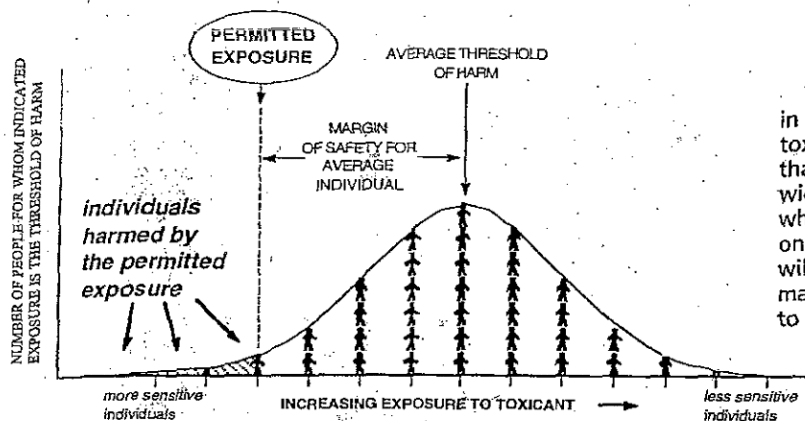


Source: T. Schettler, G. Solomon, M. Valenti, & A. Huddle. (1999). *Generations At Risk: Reproductive Health and the Environment*. The MIT Press: Cambridge, MA. p. 59.

The Wheelabrator incinerator in Claremont emitted at least 3000 pounds of mercury into the air between 1987-2002. Three thousand pounds is equivalent to 1,344,000 grams, a very large amount considering mercury's toxicity and considering that 1/3 of a gram of mercury can contaminate a 25-acre lake.¹ The New Hampshire Department of Environmental Services has issued advisories to warn the public about mercury-contaminated fish in the state's lakes, ponds, and rivers. Any additional mercury from the incinerator smokestack is unsafe.

Connett, P. (February 11, 1994). Letter to Dennis Lunderville. Air Resources Division. Department of Environmental Services. St. Lawrence University: Canton, NY.

Spectrum of Vulnerability

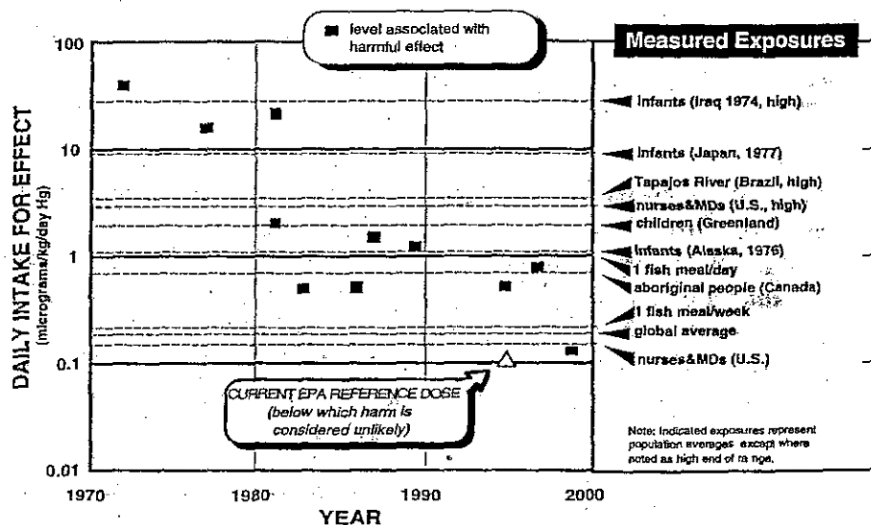


There is wide variation in individual sensitivity to toxicant exposure. This means that in a large population with widespread exposures, even when the dosage is acceptable on average, many people will still be hurt. A significant margin of safety is required to prevent such injuries.

Source: T. Schettler, J. Stein, F. Reich, & M. Valenti. *In Harm's Way: Toxic Threats to Child Development*. (2000). Greater Boston Physicians for Social Responsibility. Boston, MA. p. 55

Mercury: Inadequate Margin of Safety

Mercury exposures associated with harmful effects have been recognized at progressively lower levels over the past several decades as research methods have improved. EPA's current advised safe exposure limit, represented by the triangle, is exceeded by many groups. It is also exceeded by the global average mercury exposure. This average, based on a report of 559 hair samples from 32 locations around the world, reflects a cumulative average of levels of fish consumption, and degrees of fish contamination.^{1 2 3 4 5 6 7 8 9 10 11} (All indicated exposures were assessed as hair or blood mercury levels, except US nurses and physicians, whose exposures were estimated by dietary survey.)



Source: T. Schettler, J. Stein, F. Reich, & M. Valenti. *In Harm's Way: Toxic Threats to Child Development*. (2000). Greater Boston Physicians for Social Responsibility. Boston, MA. p. 64

data generally bolster the conclusion, reached in the 1991 statement, that lead adversely affects children's performance on tests of cognition at blood lead levels...below 10 ug/dL." ⁴⁵

The present body of literature points to no safe threshold for lead exposure. The Alliance to End Childhood Lead Poisoning states "there is nothing magic" about the 10 ug/dL threshold, "since the scientific evidence makes clear there is no safe level of lead exposure." ⁴⁶ A similar concern is found in a recent statement from the *New England Journal of Medicine*. ⁴⁷

The New Hampshire DHHS lists Claremont as a "high-risk" community for childhood lead poisoning, due to the relatively high percentage of old houses that likely contain lead-based paint. ⁴⁸ The Wheelabrator incinerator is a major pollution source for lead and other chemicals that damage the developing nervous system in children. This is unacceptable, especially given the already "at risk" pediatric population in Claremont.

Dioxins, Furans, and Polychlorinated Biphenyls (PCBs)

As stated above, dioxins and furans are recognized as highly toxic substances that build up in the environment and human body. The Environmental Protection Agency (EPA) "characterizes dioxins as some of the most dangerous chemicals known." ⁴⁹ In addition, the EPA now estimates that dioxins in food and the environment pose cancer risks between zero and an upper bound of 1 in 1,000 for the most exposed individuals. This risk characterization "is 10 times higher than the estimate in EPA's 1994 draft assessment." ⁵⁰ This risk is very high, and residents of Claremont may be at even greater cancer risk because of the Wheelabrator incinerator.

Airborne dioxin emissions from the incinerator are estimated at 0.371 pounds (168 grams) over a fifteen-year period (see Table I). This quantity may appear to be small, but dioxin compounds "are extremely toxic even in minute amounts." ⁵¹ The most recent draft of the EPA's health assessment document indicates that the current dioxin exposure of the American public, as measured by the total body burden, is at or near levels associated with adverse impacts on human health ⁵². In regard to dioxin exposure, there is

⁴⁵ Centers for Disease Control and Prevention (CDC). (2002). Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention. CDC: Atlanta: GA. p. 80.

⁴⁶ Ryan, D & Scott, R. (January 8, 2003). Memo To Lead Poisoning Prevention Advocates. Alliance to End Childhood Lead Poisoning: Washington, DC.

⁴⁷ Rogan, W. & Ware, J. (April 17, 2003). Exposure To Lead In Children-How Low Is Low Enough? The *New England Journal of Medicine* 348:16. Downloaded from www.nejm.org at Health Promotion & Disease Prevention.

⁴⁸ DHHS, Childhood Lead Poisoning Prevention Program. (1998). New Hampshire Childhood Lead Poisoning Screening and Management Guidelines. DHHS: Concord, NH.

⁴⁹ Hileman, B. (May 28, 2001). Reassessing Dioxins. *Chemical & Engineering News*. Vol. 79, Number 22. American Chemical Society: Washington, DC.

⁵⁰ Hileman, op. cit.

⁵¹ JSI, op. cit., p. 4

⁵² Lester, S. (February 19, 2002). Presentation before the National Academy of Sciences, Institute of Medicine National Research Council. Center for Health, Environment and Justice. Falls Church, VA.

little or no margin of safety. Small incremental exposures, that may appear insignificant when considered in isolation, may result in adverse effects in some segments of the population. Foster's Daily Democrat (Dover, NH) quoted a top-level state official as saying this about dioxin: "(The EPA) hasn't set a safe level because they can't. We're already all above it."⁵³ See graphics on the following pages.

The lower emission levels reported for the Wheelabrator incinerator in 2000-2001, and particularly the data of July 25, 2000, are not consistent with earlier data (e.g., approximately one-third of the levels independently reported by Entropy in 1993). Even so, measuring dioxin emissions is subject to question. JSI states that "test methods for certain compounds such as dioxin, even using EPA methodology, have been found to underestimate emissions by as much as five times."⁵⁴ The Center for Health, Environment, and Justice reports that "EPA's confidence in the data used to define dioxin releases to air, water, land, and products is weak and underestimates dioxin releases."⁵⁵ DeFre and Wevers described "cases of underestimation of dioxin emissions by point measurements in existing municipal waste incinerators in Belgium."⁵⁶ They found that the 6 hour test for dioxin, when compared with continuous dioxin monitoring, "underestimated the average emission" by a factor of 30 to 50.

Several studies link dioxin concentrations in the blood of people living near MSW incinerators to incinerator emissions. For example, a study in Japan showed that dioxin levels in the blood of people living within 2 km of an incinerator were consistently 5 times the background level for the general population.⁵⁷

In discussing dioxin-like polychlorinated aromatic hydrocarbons (PCAHS), a 1997 report from the Flemish government concluded: "Through endocrine disruption, environmental exposures to PCAHS may interfere with sexual maturation and in the long-run adversely affect human reproduction."⁵⁸

Research conducted in several countries during the 1990's "has demonstrated elevated levels of dioxins in cow's milk from farms located near to incinerators."⁵⁹ According to McLachlan,⁶⁰ "cattle represent through beef and dairy products the most important source of human exposure to polychlorinated dibenzo-*p*-dioxins and dibenzofurans (PCDD/F) in the general population, accounting for around 50% of dietary uptake." In commenting on the Wheelabrator incinerator in Claremont, Dr. Paul Connett stated that "the incinerator's potential impact on the environment has never been satisfactorily

⁵³ Emro, R. (June 25, 2000). State Tackles Dioxin Threat. Foster's Daily Democrat: Dover, NH.

⁵⁴ JSI, op. cit.

⁵⁵ Center for Health, Environment, and Justice. The American People's Dioxin Report. Downloaded at www.chej.org/policy.html

⁵⁶ DeFre, R. & Wevers, M. (1998). Underestimation in Dioxin Emission Inventories. Organohalogen Compounds, Vol. 36.

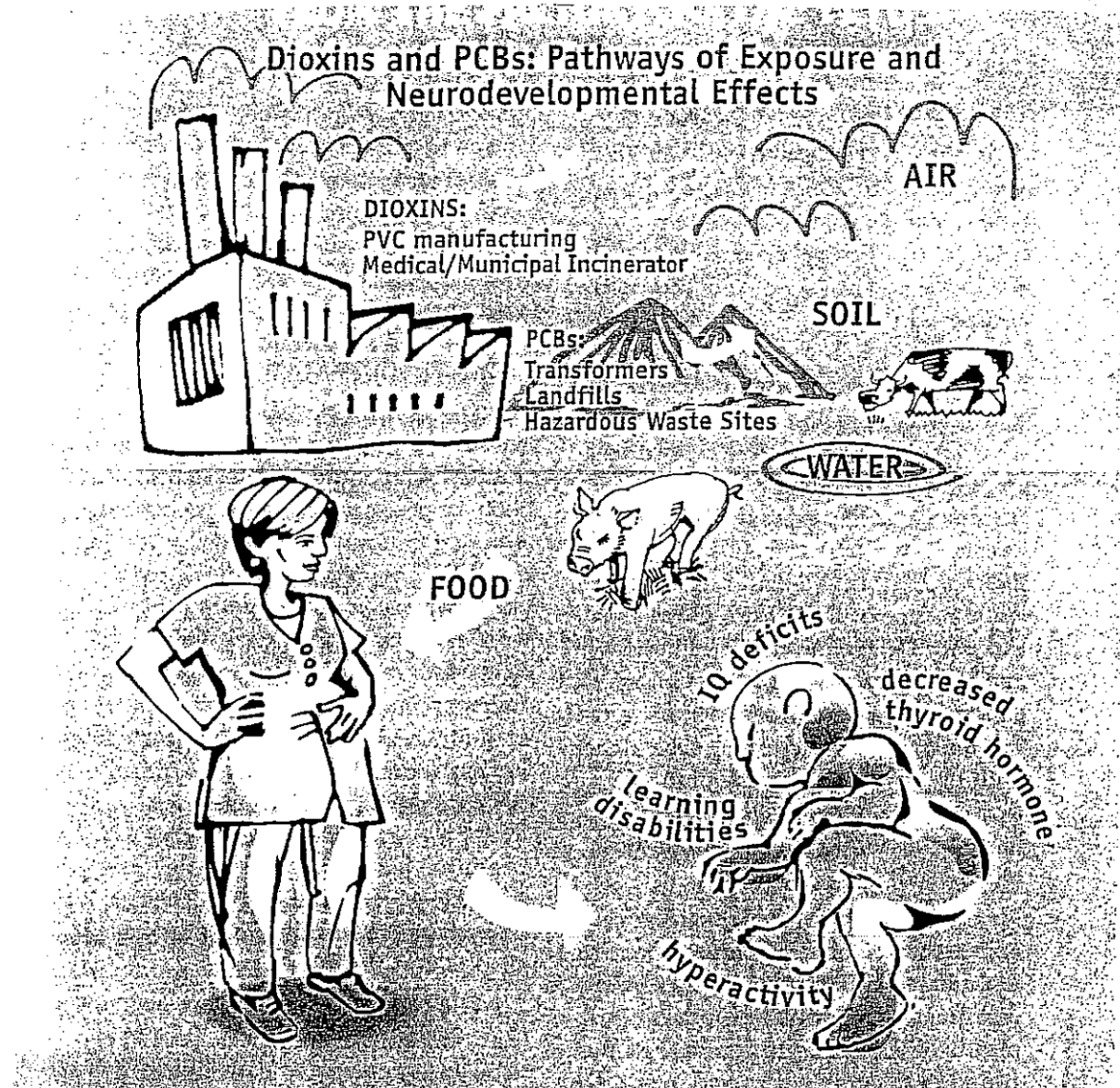
⁵⁷ Allsopp, et al., op. cit.

⁵⁸ Montague, P., Ed. (September 5, 2002). The Latest Hormone Science, part 2. Environment & Health News #751. Environmental Research Foundation: Annapolis, MD. Citing Environmental Health Perspectives, Vol. 110, No. 8 (August 2002), pages 771-776.

⁵⁹ Allsopp, op. cit., p. 39.

⁶⁰ McLachlan, M. (1995). Accumulation of PCDD/F in an Agricultural Food Chain. Ecological Chemistry and Geochemistry, University of Bayreuth, Germany.

FROM THE FACTORY TO THE FETUS



Dioxin is unintentionally produced in a variety of industrial processes, including municipal and medical waste incineration.¹ Once emitted into the air, dioxin often travels more than a thousand miles before settling on pastures and water bodies that produce the global food supply.² PCBs were produced predominantly from the 1920's to the 1980's, for use in a variety of products including transformers, capacitors, and lubricant oils.³ While PCB production has been banned in most countries, approximately two-thirds of the total amount produced has not yet been released to the environment.⁴ PCBs have been introduced into the environment through careless disposal, leakage from industrial facilities and waste disposal sites, and from products in use.⁵⁻⁶ PCBs introduced to land or water bind to soil and sediment particles, evaporate at various rates, and, like dioxin, undergo long range atmospheric transport.⁷⁻⁸

Because of their similar chemical properties, PCBs and dioxin have similar patterns of long range atmospheric transport resulting in widespread deposition. Both accumulate in the cattle and fish feeding on contaminated vegetation, and concentrate further in species eating high on the food chain, including humans. PCBs and dioxin can remain in soil for many years.⁹⁻¹⁰ Laboratory studies in animals have demonstrated significant dermal absorption of PCBs, but not of dioxin, following contact with contaminated soil.¹¹⁻¹³ However, most human exposure to both PCBs and dioxins occurs through food consumption.¹⁴⁻¹⁵ Because dioxin and PCBs are carried by fat, they are passed during pregnancy from mother to fetus, the most vulnerable stage of human development, and continue to be transmitted during breast feeding. Dioxin and PCBs thus illustrate one of the unforeseen pathways by which industrial chemicals may travel from the factory to the fetus.

Source: T. Schettler, J. Stein, F. Reich, & M. Valentl.
In Harm's Way: Toxic Threats to Child Development.
 (2000). Greater Boston Physicians for Social
 Responsibility. Boston, MA. p. 77

Current Dietary Dioxin Exposures

- = 1 pg/kg/day (the advised limit for chronic exposure)

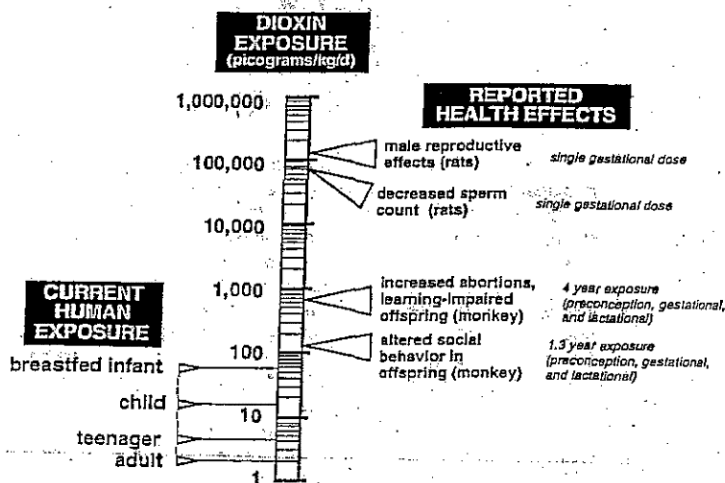
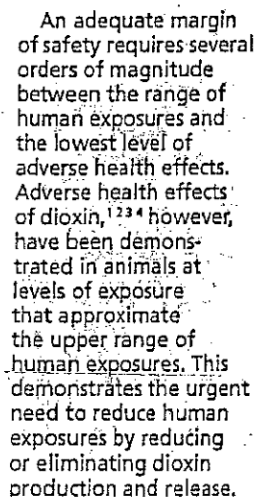
AGE GROUP	EXPOSURE	
Over 20 years	••	2X
10-14 years	••••••••	1-16X
5-9 years	••••••••••••	1-27X
1-4 years	••••••••••••••	1-32X
Breast-fed Infant	•••••••••••••••• ••••••••••••••••	34-53X

* Based on a minimal risk level defined by ATSDR as a level at or below which adverse health effects are not expected to occur in humans. Chronic exposure is defined as an exposure lasting 1 year or longer.

Dioxin is concentrated in animal fat, and accumulates at higher levels in long-lived animals, and animals higher in the food chain. Because human food sources vary with age, dioxin intake also varies with age.^{1, 2} Because dioxin is concentrated in breast milk, the intake of breast-feeding infants is highest, exceeding ATSDR's recommended limit for chronic exposure (one year or longer) by a factor of 34-53. This limit is exceeded to lesser degrees in all age groups. According to EPA, if one were to calculate, based on all human and animal data, a dioxin exposure limit that would protect against noncancer effects, (incorporating uncertainty factors to account for species differences and sensitive populations, such as the fetus), this exposure limit would be "on the order of 10 to 100 times below the current estimates of daily intake in the general population."³

Source: T. Schettler, J. Stein, F. Reich, & M. Valenti. In Harm's Way: Toxic Threats to Child Development. (2000). Greater Boston Physicians for Social Responsibility. Boston, MA. p. 75

Dioxin: Inadequate Margin of Safety



Source: T. Schettler, J. Stein, F. Reich, & M. Valenti. In Harm's Way: Toxic Threats to Child Development. (2000). Greater Boston Physicians for Social Responsibility. Boston, MA. p. 76

addressed, especially with regard to the buildup of pollutants in the food chain.”⁶¹

An international treaty to eliminate anthropogenic sources of dioxin and other persistent toxic substances has been adopted by the US.⁶² The American Public Health Association, representing more than 50,000 health care professionals, has also endorsed the treaty.⁶³ APHA supports a “pollution-prevention” approach to dioxins, furans, and other unintentional byproducts, with the aim of “eliminating” all significant man-made sources and releases. The Wheelabrator incinerator in Claremont is one such source.

PCBs can cause learning disabilities, attention deficit, memory impairment, hyperactivity, and psychomotor dysfunction.⁶⁴ Very little data are available concerning Wheelabrator incinerator stack emissions of PCBs. Based upon the one measurement in 1993, an estimated 0.019 lb of PCB’s were emitted in the 15 year period. One study in Spain⁶⁵ indicated an increase of 12% in the PCB blood concentrations of people up to 4 km from an MSW incinerator in 1997 after 2 years of operation.

Even “relatively low” levels of PCBs in the blood are of concern. Environment and Health News,⁶⁶ reports:

A study of 100 adolescents who grew up near waste incinerators or a metal smelter shows developmental delays in sexual maturity, compared to a control group living in an uncontaminated rural area. Adolescents in Flanders (Belgium) living in moderately polluted urban neighborhoods have “relatively low” levels of PCB’s and [PCAHs] in their blood. Even these low levels correlated with delayed sexual maturation in both girls and boys, the study concludes.

As referenced above, in 1995 DES and DHHS took preliminary steps to assess the risk from exposure to pollution from the Wheelabrator incinerator. This activity continued in 1996, at which time ARD stated that it “has completed the ambient air quality impact modeling analysis portion of the Wheelabrator risk assessment.”⁶⁷ Modeling results were determined for mercury, dioxins, and furans. Using an EPA-approved ambient air quality modeling program, “maximum values were predicted for the terrain surrounding the incinerator, as well as three nearby watershed areas specified by DHHS (i.e., the Crescent Lake watershed, the Mountainview Lake watershed, and the Lake Sunapee watershed)” (p. 1).

⁶¹ Connett, P. (February 11, 1994). Letter to Dennis Lunderville, Air Resources Division, Department of Environmental Services. St. Lawrence University: Canton, NY.

⁶² Yeager, B. (December 10, 2000). US Statement on Persistent Organic Pollutants Treaty. The United States Mission to the European Union. Brussels, Belgium.

⁶³ Phibbs, P. (November 27, 2000). APHA Resolution Backs Elimination, Endorses Different Deadlines for Chemicals. Chemical Regulation Reporter. Bureau of National Affairs, Inc.: Washington, DC. p. 2247.

⁶⁴ Schettler et al. (2000). op. cit., p. 94.

⁶⁵ Allsopp, et al., op. cit.

⁶⁶ Montague, P., Ed. (September 5, 2002). op. cit.

⁶⁷ DES. (March 22, 1996). Interoffice Memorandum from Jeremy Ladd and Jim Black to John Dreisig and Todd Kennedy, DHHS. DES: Concord, NH, p. 1.

Graphics were generated to show five-year average annual concentration and deposition values for mercury and dioxin in the vicinity of the incinerator (p. 3). For example, ARD found that "the maximum annual vapor phase mercury concentration was predicted to occur approximately 2.25 km southeast of the incinerator" (p. 3).

In a memo dated April 26, 1996,⁶⁸ DHHS staff stated that a reasonable time frame for completion of the assessment project "would be by September" (p. 3). The project was apparently never completed.

RESPIRATORY IRRITANTS: Particulate Matter, Oxides of Nitrogen, Sulfur Dioxide

Particulate Matter

Particulate matter is a mixture of solid particles and liquid droplets. PM_{2.5} is a type of particulate matter that can penetrate deep into the lungs. PM_{2.5} can precipitate asthma symptoms. Nitrogen dioxide (NO₂) and sulfur dioxide (SO₂) are sources of PM_{2.5}. Nitrogen Oxides (which include NO₂) also contribute to the formation of ozone (O₃), the most potent of the outdoor air pollutants. O₃ is suspected to induce or enhance the inflammatory response of the respiratory system.⁶⁹

According to Avakian et.al:⁷⁰

Many acute and chronic population-based epidemiologic studies have been conducted, and the overall evidence indicates a probable link between fine particulate air pollution and adverse effects on cardiopulmonary health, suggesting that all individuals who are chronically exposed may ultimately be affected.

The Boston Globe recently reported on a study by scientists from the Harvard School of Public Health and the University of Basel in Switzerland. The study "concluded that as many as 11 percent of infant deaths in the United States-some 3000 per year-might be the result of microscopic particles in the air."⁷¹

Reported PM emissions for the Wheelabrator incinerator total approximately 135, 400 pounds during the last 15 years.

⁶⁸ DHHS. (April 26, 1996). Inter-Department Communication from John Dreisig and Todd Kennedy to Jim Black and Jeremy Ladd, DES, DHHS: Concord, NH.

⁶⁹ Rosales-Guevara, L. (2002). Environmental Triggers of Asthma. Hazardous Substances and Public Health. Vol. 12, No. 2. page 8

⁷⁰ Avakian, M., Dellinger, B., Fidler, H., Gullet, B., Koshland, C., Marklund, S., Oberdorster, G., Safe, S., Sarofim, A., Smith, K., Schwartz, D., and Suk, W. (2002). The Origin, Fate, and Health Effects of Combustion By-Products: A Research Framework. Environmental Health Perspectives. Vol 110, No. 11.

⁷¹ Polakovic, G. (December 17, 2001). Studies Link Smog With Infant Deaths. Boston Globe. Boston, MA.

Nitrous oxides (NO_x)

Nitrous oxide compounds are emitted from all combustion sources. In the incineration process they arise from oxidation of solid waste components containing nitrogen (e.g. yard waste) and high temperature oxidation of naturally-occurring nitrogen in the air. At temperatures below 2000° F, typical in municipal solid waste (MSW) incinerators, oxidation of nitrogen in the waste fuel is the predominant mode of generation, accounting for 75-80% of nitrogen oxide emissions.⁷²

Nitrous oxides can cause eye irritation, kidney inflammation, cardiovascular disturbances, and damage to the respiratory system. Nitrous oxides contribute to the formation of ground level ozone, a component of smog, and are a precursor of acid rain, which damages many New Hampshire ecosystems.⁷³

Approximately 5.2 million pounds of nitrous oxides were emitted by the Wheelabrator incinerator during the years 1987-2002.

Sulfur dioxide (SO₂)

Sulfur dioxide (SO₂) is produced from oxidation of sulfur in MSW. SO₂ can cause burning of the eyes, shortness of breath, chest tightness and irritation of the respiratory tract. It is a precursor to sulfuric acid, which contributes to acid rain. Sulfur is found in virtually all fractions of the waste stream, so that altering the composition of the waste stream has little effect on emissions.⁷⁴

Almost 1.3 million pounds of SO₂ were emitted by the Wheelabrator incinerator in the 15 year period, or about 86 thousand pounds per year.

The Claremont Eagle Times reported in 1997⁷⁵ that the local hospital developed a Pulmonary Rehabilitation Program to respond to a “dramatic rise” in lung disease among its client population.

A report by DHHS (August 2001)⁷⁶ states that “hospital admissions for acute ambulatory care sensitive conditions, such as pneumonia and other infections, were significantly higher in [the Claremont Healthcare Service Area] compared to the State rate (8.6 per 1000 population vs. 7.4 per 1000 population).” This indicates that residents of Claremont and surrounding communities are an “at-risk” population.

⁷² JSI, op. cit., p. 7, citing California Air Resources Board, 1984. Air Pollution Control at Resource Recovery Facilities, May 24.

⁷³ JSI, op. cit., p. 7

⁷⁴ JSI, op. cit., p. 8.

⁷⁵ Valley Regional Hospital. (March 16, 1997). VRH Pulmonary Rehab Program. Eagle Times. Claremont, NH.

⁷⁶ DHHS. (2001). New Hampshire Regional Health Profiles, Claremont Healthcare Service Area. DHHS: Concord, NH.

Carbon monoxide (CO): Ongoing Permit Violations

Carbon monoxide (CO) gas is a product of incomplete combustion of the carbon in MSW. CO can impair mental functions, affect fetal development and aggravate heart conditions.⁷⁷

A UCLA study⁷⁸ links air pollution from high levels of carbon monoxide and ozone to birth defects. Researchers found that women exposed to high levels of these gases were three times more likely to have babies with cleft lips and palates, and defective heart valves.

About 167,000 pounds of Carbon Monoxide were released by the Wheelabrator incinerator in the fifteen year period, or an average of about 11,350 pounds per year.

On May 4, 1989 and May 17, 1990, ARD issued Administrative Orders to Wheelabrator for permit violations involving CO emissions.^{79, 80} Excess Emission Reports, submitted by Wheelabrator to ARD on a quarterly basis, indicate **234 permit violations for CO and 664 permit violations for steam rate from 1987 to 2002.**⁸¹

Volatile Organic Compounds

VOCs interact with nitrogen oxides to form ozone.⁸² Ground level ozone increases respiratory illness and can damage crops and forests.⁸³ During the past 15 years, reported VOC emissions for the Wheelabrator incinerator total approximately 51,000 pounds.

RELEVANCE OF LEGAL AND REGULATORY FRAMEWORK FOR INCINERATOR EMISSIONS

Limits on emissions of toxic substances from incinerators as a means of controlling or mitigating effects on human and other populations appear to be no longer relevant. As most of these substances are persistent chemicals that are not readily degradable to benign form, the buildup of concentrations in human and animal body tissue has reached the point where there is no longer a safe level of additional loading.

The IJC's 1994 biennial report states:⁸⁴

The characteristics of persistent toxic substances make them much less amenable to traditional control efforts such as discharge limits to set acceptable levels in the environment, end-of-pipe technology and disposal

⁷⁷ JSI, op. cit., p. 9

⁷⁸ Cited in Polakovic, op. cit.

⁷⁹ DES/ARD. (May 4, 1989). Administrative Order No. ARD 89-004. ARD: Concord, NH.

⁸⁰ DES/ARD. (May 17, 1990). Administrative Order No. ARD 90-012. ARD: Concord, NH.

⁸¹ Excess Emissions Reports, 1987-2003. Wheelabrator files these reports with ARD on a quarterly basis. The reports concern permit conditions for carbon monoxide, opacity, and steam rate.

⁸² JSI, op. cit., p. 9

⁸³ JSI, Ibid., p. 9

⁸⁴ IJC, op cit, p. 7

regulations. The idea of a non-zero 'assimilative' capacity in the environment or in our bodies is *no longer relevant* (italics added). Within the environment's carrying capacity for human activity, there is no space for human loadings of persistent toxic chemicals that accumulate for long periods, except that which nature itself generates. Moreover, conventional scientific concepts of dose-response and acceptable 'risk' can no longer be defined as 'good' scientific and management bases for defining acceptable levels of pollution. They are outmoded and inappropriate ways of thinking about persistent toxics.

In September 1999, Wheelabrator of Millbury, MA joined with Ogden Martin of Haverhill, MA in a suit against the Commissioner of the Massachusetts Department of Environmental Protection.⁸⁵ Here Wheelabrator and Ogden Martin state their opposition to the mercury air emission standard of .028 milligrams per dry standard cubic meter, the same standard adopted by the state of New Hampshire. According to the plaintiffs, available data indicate the standard "cannot be met on a consistent and continuous basis" at incinerators in Massachusetts.

New Hampshire allows 85% control efficiency in lieu of compliance with the .028 standard. The 85% control efficiency is a loophole that could increase airborne mercury pollution. The retrofit application referenced below indicates that potential emission rates using the 85% standard are higher than potential emission rates under the .028 standard.

The draft Title V permit for the Wheelabrator incinerator also allows an exemption from operating requirements "during periods of municipal waste combustion unit startup, shutdown, or malfunction."⁸⁶ This is dangerous because the quantity of toxic air emissions "tend to be greatest during upset conditions, such as shutdown and start-up."⁸⁷ In 1991 DES denied a request by Wheelabrator's to be granted the exemption.⁸⁸ It appears that this decision would be reversed if DES issues the Title V permit as drafted.

In its Dioxin Reduction Strategy (2001), DES fails to consider dioxin content of incinerator ash, a situation that underestimates dioxin emissions from the Wheelabrator incinerators in Claremont and Concord.⁸⁹ Hundreds of thousands of tons of ash containing dioxin and other toxics have been deposited at the Newport ash landfill, and DES has acknowledged that there is "apparently a leak" in the liner there.⁹⁰ The public

⁸⁵ United States District Court, District of Massachusetts. Integrated Waste Services Association, Ogden Martin Systems of Haverhill, Inc. and Wheelabrator Millbury, Inc., Plaintiffs, v. Lauren Liss, In Her Capacity as Commissioner of Massachusetts Department of Environmental Protection, Defendant. Complaint for Declaratory and Injunctive Relief #16990. September 1999.

⁸⁶ New Hampshire Department of Environmental Services, Air Resources Division. (2003). Title V Operating Permit, External Draft, Wheelabrator Claremont Company, LP. ARD: Concord, NH.

⁸⁷ Collins, R. (October 31, 1990). Letter to Dennis Lunderville, Director, Air Resources Division. Clean Water Action: Washington, DC.

⁸⁸ DES (April 23, 1991). Letter from Robert Varney to William Gallagher, Working on Waste. DES: Concord: NH

⁸⁹ DES. (2001). Dioxin Reduction Strategy. DES: Concord, NH.

⁹⁰ DES. (February 12, 2003). Letter from Richard Reed to Katie Lajoie (citing DES correspondence dated June 4, 2001). DES: Concord, NH.

presently pays \$1,000,000 per year to haul ash from the Claremont incinerator to a site in Massachusetts.

POST-RETROFIT EMISSION LIMITS

As a result of recent legislation covering the Wheelabrator incinerator mercury emissions, a retrofit program has been proposed by the company to "satisfy the requirements of Emission Guidelines for Small Municipal Waste Combustion (MWC's) (40 CFR 60 Subpart BBBB)." ⁹¹ The post-retrofit emissions limits are shown in Table 4-1 of the Temporary Permit Application for NSPS Subpart BBBB Retrofit: Wheelabrator Claremont Company, L.C., September 2002 prepared by Earth Tech of Concord Massachusetts (the Application). ⁹²

Table III includes a calculation of the proposed limits, which are presented in terms of pounds per year to facilitate comparison with average emissions during the years 1987-2002 as calculated from available emissions data. As indicated above, the average values are determined using regression analysis and averages as appropriate for the available data.

For all but two substances covered in the Application, emission limits exceed the averages emitted during the 15 year period. Lead emissions limits, for example, would go up be a factor of over 50 (5,176 %). Only TCDD (Tetra Chloro Dibenzo-Dioxin) is reduced. Furan emissions (TCDF's) could actually increase by a factor of 16. Although airborne mercury emissions would be reduced, unacceptable amounts of mercury, along with other toxic chemicals, would continue to exit the smokestack.

Post-retrofit emission levels will be determined after the installation of the new emissions control system. It is clear that, with the exception of reductions in airborne TCDD and mercury, potential increases of other emissions would be of concern to area residents.

Table III Post Retrofit Emission Limits Compared with 1987-2002 Averages				
Pollutant		Post Retrofit	Average	%
		lb/year (2)	lb/yr 1987-2001	change
PM	Particulate matter	32,720	9,025	263.0%
SO ₂	Sulfur dioxide	138,800	85,947	61.5%
CO	Carbon monoxide	79,015	11,156	608.2%
HCl	Hydrochloric acid	131,600	40,051	228.1%
D/F	TCDD (1)	0.0060	0.0064	-6.7%
	TCDF (1)	0.0832	0.0048	1633.3%
Lead		1080	21	5042.1%
Cadmium		68	3	2166.6%
Mercury		70	213	-67.1%

(1) From sum of regression values - average for 15 years

(2) Emission limits, Temporary Permit Application for NSPS Subpart BBBB Retrofit: Wheelabrator Claremont Company, L.P. September 2002 estimated by multiplying hourly per boiler rates by 2 and by the number of hours per year (8,760)

⁹¹ Earth Tech. (September 2002). Temporary Permit Application for NSPS Subpart BBBB Retrofit: Wheelabrator Claremont Company, L. P. Earth Tech: Concord, MA.

⁹² Earth Tech, Ibid

CONCLUSIONS REGARDING RETROFIT

1. The presence of the incinerator in Claremont has already resulted in the emissions of over 7.5 million pounds of toxic substances. The presence of these substances and their buildup in living tissue has probably already caused considerable damage to the health and development of citizens and other forms of life in the vicinity of the incinerator.
2. Humans and other forms of life have little or no additional tolerance for further exposure to these substances.
3. The proposed retrofit of the incinerator will result in a reduction in some airborne pollutants, but has the potential to dramatically increase the emissions of others.
4. Shifting pollutants from air to ash creates its own set of problems through ash handling, transport and disposal.
5. It is impossible to determine present and future compliance with applicable air emission regulations because there is no ongoing monitoring of the pollutants that are referenced in the regulations.⁹³ In addition, the regulations themselves are not protective of public health.

COST OF INCINERATION

A paper by Christopher Neurath in January of 1993⁹⁴ developed the cost of incineration emissions in terms of monetized adverse health and economic impacts. The study was based on incinerators in California that were equipped with bag filters and wet/dry scrubbers. The cost estimates were based upon another study by the Tellus Institute in 1991, "Disposal Cost Fee Study, Boston."⁹⁵ A synopsis of the Neurath report is enclosed.⁹⁶

The total cost of incineration at that time was estimated at \$0.13 per kwh. Accounting for inflation in the interim, the present cost is estimated at \$0.17 per kwh. The Wheelabrator incinerator generates electricity and produces about 35 million kwh per annum. This calculates to a cost to area residents of about \$6 million per year.

The Neurath report has been provided to the New Hampshire Public Utilities Commission.⁹⁷

⁹³ Connett, P. (December 5, 1995. Petition for Intervention: Air Resources Division Permits #PO-C-362 and #PO-C-363. Appeal Filed by John G. Tuthill on October 9, 1995. Canton: NY.

⁹⁴ Neurath, C. (1993). Incineration Compared to Energy and Waste Management Alternatives: A Full Environmental Costs Analysis. Work on Waste USA: Canton, NY.

⁹⁵ Cited in Neurath, op cit.

⁹⁶ Connett, P. and E. Eds. (January 15, 1993). Incineration Compared to Energy and Waste Management Alternatives: A Full Environmental Costs Analysis (synopsis). Waste Not #224. Work on Waste USA: Canton, NY

⁹⁷ New Hampshire Public Utilities Commission (PUC). (May 15, 2003). Merit Hearing Docket 03-030. PUC: Concord, NH.

CONCLUSIONS AND RECOMMENDATIONS

This report indicates that the Wheelabrator incinerator in Claremont is an unacceptable risk to public health and the environment. Wheelabrator is out of compliance with its air permit for CO and steam rate, and the draft Title V permit, if issued, would exempt Wheelabrator from reporting pollution levels during start-up, shut-down, and malfunction. In addition, the end-of-the-pipe emission standards for persistent toxic substances are irrelevant because these substances build up in the environment and human body and are toxic in even low doses. Closure of the incinerator and an orderly transition to a recycling-based system for Claremont and the rest of Sullivan County are the only options that will protect public health. Closure will result in cleaner air and a better image for the area. Closure will also provide a significant economic benefit to the residents of Sullivan County. This complies with RSA 125-C:1⁹⁸

It is hereby declared to be the public policy of the state of New Hampshire and the purpose of this chapter to achieve and maintain a reasonable degree of purity of the air resources of the state so as to promote the public health, welfare, and safety, prevent injury or detriment to human, plant, and animal life, physical property and other resources, foster the comfort and convenience of the people, promote the economic and social development of this state and to facilitate the enjoyment of the natural attractions of the state.

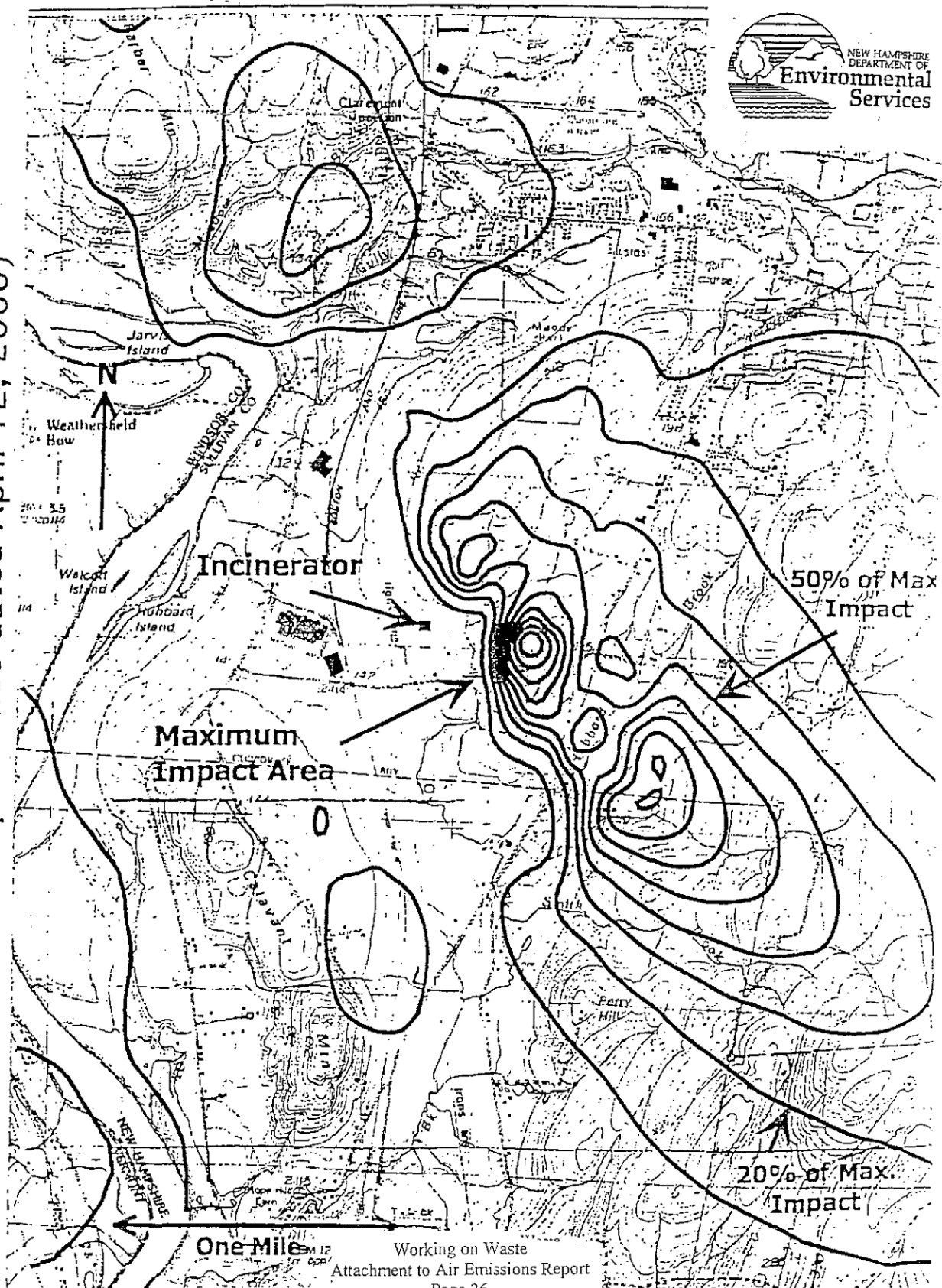
⁹⁸ State of New Hampshire. (1979) State Statute Title X Public Health, Chapter 125-C, Air Pollution Control.

Attachments

- New Hampshire Department of Environmental Services. Modeled Distribution of Maximum Annual Impacts from the Wheelabrator Facility. (Map distributed with DES correspondence dated April 12, 2000). DES: Concord, NH.
- Connett, Paul and Ellen (Eds.). Waste Not #224. (January 15, 1993). Work on Waste USA: Canton, NY.
 - 1. If the Answer is Incineration, Someone Asked the Wrong Question
 - 2. Incineration Compared to Energy and Waste Management Alternatives: A Full Environmental Costs Analysis
 - 3. Recycling Versus Incineration: An Energy Conservation Analysis
- National Association of Physicians for the Environment. Executive Summary: National Conference on Air Pollution Impacts on Body Organs and Systems. (September 1995). NAPE: Bethesda: MD.
- McConnell, Amy. State Wants to Study Exposure to Toxins. Concord Monitor. (February 4, 2003). Concord Monitor: Concord, NH.

Modeled Distribution of Maximum Annual Impacts from the Wheelabrator Facility

Map showing annual distribution of pollutants from stack of Wheelabrator incinerator in Claremont, using computerized air quality modeling (Enclosed with DES correspondence dated April 12, 2000)



In 1990 Pollution Probe of Toronto, Canada, commissioned Work on Waste USA to do a series of reports commenting on parts of the Province's energy utility's (Ontario Hydro) proposed 25-year energy plan. WOW-USA contracted out one of the three reports to Sound Resource Management Group. The reports, reviewed below, were submitted in January 1993.

IF THE ANSWER IS INCINERATION, SOMEONE ASKED THE WRONG QUESTION.

Available from Waste Not: 33 pages. \$7 for current subscribers. \$14 for non-subscribers. This report, authored by the editors of *Waste Not*, is a concise, up-to-date and expanded analysis of the advantages and disadvantages of municipal solid waste (MSW) incineration. This report will prove of significant importance to individuals and communities engaged in incinerator battles. The report discusses:

- The Advantages and Disadvantages of MSW Incineration
- The Building History of Trash Incineration in the U.S. and Europe
- Incineration is not the Proven Technology it is Claimed To Be
- The Use of Health Risk Assessment to Placate the Public's Fears about Incinerator Emissions
- The Better Alternative and Avoiding the Trap of "Integrated Waste Management"

We would like to share the generic health risk assessment we produced in this report, that is guaranteed to save communities at least \$50,000 in consultant's fees. It is one sentence long: It reads: **No risk is acceptable if it is avoidable.** Though much of the information in the report has been discussed in *Waste Not*, it does include new information, such as the timeline of the construction of trash incinerators in the U.S. from 1963 to 1991 as compared to six European countries for the same years. What we learned was: in the early 80's American communities were lured into building incinerators on the basis of how successful this technology was in Europe. In reality, very few incinerators were built in Europe from 1979 to 1991 and only six European countries burn more than 30% of their waste.

Incineration Compared to Energy and Waste Management Alternatives: A Full Environmental Costs Analysis.

By Christopher Neurath for Work on Waste USA.

Available from *Waste Not*: 45 pages. \$7 for current subscribers. \$14 for non-subscribers.

The report addresses the Province of Ontario, Canada, but results are broadly applicable to all areas of North America. This report made quantitative estimates of the overall environmental costs of: incineration, composting, recycling, and waste reduction; and of energy production and energy conservation. Also estimated were the benefits of avoided production of materials due to recycling with the conventional costs of each solid waste management method or energy method to arrive at the overall costs/benefits to society of each technology. The report also compared three mixes of the waste management methods which were representative of three possible Ontario-wide scenarios. **The Report's Findings:**

1. "State-of-the-art" incinerators emit more pollution per kilowatt hour (kWh) than natural gas or even coal fired fueled power plants for virtually all pollutants.
2. When pollutant emissions are weighed by how harmful that pollutant is to health and the environment, incineration turns out to be about 2000% more damaging than natural gas per kWh and about 30% more damaging than coal per kWh.
3. Incineration has higher overall costs (environmental plus conventional) to society than: new lined landfills, centralized composting of organics, backyard composting, recycling, or reduction.
4. Incineration also has higher conventional costs than all the above alternatives.
5. Based on recent estimates of environmental and conventional costs/benefits, the current waste management hierarchy in Ontario is rational and if followed, can provide Ontario society with the lowest overall net costs. Our results of net costs for each method: (a.) Reduction yields a net benefit to society of \$400 Canadian per metric tonne. (b.) Recycling yields a net benefit to society of \$75/tonne. (c.)

Backyard composting has a net cost of \$45/tonne. (d.) Centralized composting of source-separated organics costs society \$150/tonne. (e.) New style lined landfill costs society \$220/tonne. (f.) "State-of-the-art" incineration costs society \$250/tonne.

6. Based on the above findings, one can conclude it is *never* economically or environmentally beneficial to include *any* incineration in a region's waste management system.

Recycling Versus Incineration: An Energy Conservation Analysis.

by Jeffrey Morris and Diana Canzoneri of Sound Resource Management Group, Inc.

Available for \$35 from SRMG, 5025 California Avenue, SW, Seattle, WA 98136. Tel: 206-932-3404. Though Sound Resource Management Group's (SRMG) paper is a critique of the Canadian utility's, Ontario Hydro, 25-year Energy Plan, currently under adjudicatory review, the information in this report is an excellent resource for every community. Prior to the law banning municipal waste incineration, Ontario Hydro produced a 25-year energy plan that included "plans by the year 2000 to obtain over 90 Megawatts (MW) of generation capacity from incineration of at least 30% of Ontario's metropolitan area municipal solid waste (MSW) in large scale energy-from-waste (EFW) facilities." The SRMG report demonstrates EFW is not an efficient source of electrical power. "More energy can be conserved by recycling than can be generated by incinerating the various materials which make up Ontario's municipal solid waste. On average, we estimate that recycling saves three to five times as much energy as is produced by incinerating MSW." Furthermore, energy conserved by manufacturing with recycling materials rather than virgin materials exceeds incineration energy by enough to pay the energy costs of shipping recycled materials to very distant markets. We estimate that on average recycled waste materials can be shipped over 12,000 kilometers (km) by truck, or 54,000 km by rail, before recycling's energy conservation savings are dissipated."

From SRMG's Table E-1:

Energy Conserved in Recycled Content Manufacturing Compared with Energy from Waste Incineration

Waste Stream Materials	Energy Conserved by Substituting Secondary for Virgin Raw Materials	Energy Generated from MSW Incineration
Paper	(MJ/MG)	(MJ/MG)
Newspaper	22,398	8,444
Corrugated Cardboard	22,887	7,388
Office (Ledger & Computer Printouts)	35,242	8,233
Other Recyclable Paper	21,213	7,600
Plastic		
PET	85,888	21,004
HDPE	74,316	21,004
Other Containers	62,918	16,782
Film/Packaging	75,479	14,566
Other Rigid	68,878	16,782
Glass		
Containers	3,212	106
Other	582	106
Metal		
Aluminum Beverage Containers	256,830	739
Other Aluminum	281,231	317
Other Non-Ferrous	116,288	317
Tin and Bi-Metal Cans	22,097	739
Other Ferrous	17,857	317
Organics		
Food Waste	4,215	2,744
Yard Waste	3,556	3,166
Wood Waste	6,422	7,072
Rubber		
Tires	32,531	14,777
Other Rubber	25,672	11,505
Textile		
Cotton	42,101	7,283
Synthetic	58,292	7,283
Diapers	10,962	10,713

WASTE NOT # 224. A publication of *Work on Waste USA*, published 48 times a year. Annual rates are: Groups & Non-Profits \$50; Students & Seniors \$35; Individual \$40; Consultants & For-Profits \$125; Canadian \$US45; Overseas \$65. Editors: Ellen & Paul Connett, 82 Judson Street, Canton, NY 13617. Tel: 315-379-9200. Fax: 315-379-0448.

EXECUTIVE SUMMARY

(Published September 1995)

NATIONAL CONFERENCE ON AIR POLLUTION IMPACTS ON BODY ORGANS AND SYSTEMS

Held by the National Association of Physicians for the Environment
November 18, 1994

With funding support from the
National Institute of Environmental Health Sciences
and additional support from
American Medical Association
American Academy of Otolaryngology-Head and Neck Surgery, Inc.
American Academy of Dermatology
National Heart, Lung and Blood Institute
National Library of Medicine
Agency for Toxic Substances and Disease Registry

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NOTE: Published proceedings of the Conference will be available September 20, 1995 and will also be available on NAPENet on the Internet (World Wide Web) on that date. NAPENet Internet address: <http://intr.net/napenet> The full text of scientific papers will be published in December 1995 or January 1996 in the *Journal of the American Academy of Otolaryngology-Head and Neck Surgery, Inc.*, which will be available in medical and other libraries.

BACKGROUND

Presentations at a national conference, called by the National Association of Physicians for the Environment (NAPE) on "Air Pollution: Impacts on Body Organs and Systems," in November, 1994, and related meetings held before and after, indicate that most of the major body organs and systems, not only the lungs, can be affected by air pollution.

PRESENTERS

G. Richard Holt, MD, of San Antonio, Texas, was chairman; Dr. Alfred Munzer, MD, then President of the American Lung Association, co-chaired.

Over 30 medical and environmental experts presented papers at the conference; especially valuable were presentations from medical specialists on the particular organs and systems about which they have extensive training and clinical experience. They were asked to consider the question whether or not indoor and outdoor air pollutants have an impact on the body organs and systems with which they are familiar and, if they do, what is the impact, how does the impact occur, and what is the effect. They were asked to survey the medical literature in their fields and to provide valid, scientific reports, with full documentation of sources, and to refrain from unfounded speculation. They were not asked to, in any way, involve themselves in public policy

"Pollution Prevention is Disease Prevention"



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questions, whether legislative or regulatory at any level of government, and were not asked to rank pollutants to impacts by levels of risk, or to deal with any cost-benefit issues involved in air pollution control.

FINDINGS: IMPACTS ON BODY ORGANS AND SYSTEMS

While exposure to air pollutants occurs most often through the lungs by inhalation of indoor and outdoor contaminated air, humans and animals are also exposed to air pollutants through other routes of entry into the body.

Air pollutants also can enter the body by absorption through the skin, or through the gastrointestinal tract by drinking contaminated water or eating food which may have been polluted either directly by airborne deposition, or indirectly through bioaccumulation in the food chain as a result of air pollution impacts on fish, animals and plants. Examples of air pollutants that humans and animals are likely to be exposed to in food and water include pesticides, PCBs, dioxin and heavy metals, such as cadmium, lead and mercury.

Once air pollutants gain entry into the body, a wide variety of health effects can result.

When pollutants are inhaled, the damage can begin with direct toxic effects on the nose, throat, sinuses, trachea and lungs. Tobacco smoke, solvents and radon are examples of pollutants researchers have linked to cancer of the respiratory and other systems in people and animals. A variety of chronic diseases are also linked to air pollution, such as chronic sinusitis, chronic bronchitis, exacerbation of asthma and allergies. Ear infections, also, are strongly linked with childhood exposure to tobacco smoke.

After pollutants are inhaled or otherwise taken into the body, they can enter the blood stream, where their potential harmful effects are distributed to other systems throughout the body; blood perfuses every organ and can carry toxic as well as beneficial substances to them. Also, direct damage to the blood system can occur leading to such disorders as anemia or leukemia. Secondary heart disease can also occur, including hypertension and cardiac arrhythmias. The urogenital system can be affected with resulting kidney disease, bladder cancer and reproductive problems in both men and women.

The skeletal system can be affected as it stores certain heavy metals, such as lead, which can accumulate over time. This can lead to later release of the toxins back into the body during times of bone change (loss), such as pregnancy, lactation, or osteoporosis, thereby potentially threatening especially the health of women, newborn children, and senior citizens.

Air pollutants can harm the immune system in a variety of ways. In some instances, they can over-stimulate the immune response leading to allergies and immune-mediated diseases. In other cases, they can cause immune suppression.

The nervous system can also be involved, with health effects ranging from psychological disorders to toxic damage to the nervous system and brain, especially in developing fetuses or young children. Changes in mood, cognition and behavior have been shown to occur with increases in

certain air pollutants -- mental health seems to be related to environmental health. In addition, there are less well understood detrimental effects of pollutants (especially those relating to reproductive systems) to the endocrine system which require a great deal more research to fully understand. Skin cancer and skin disorders, immune system effects, and eye disorders can result from excessive UV radiation from the sun. Also, many scientists are concerned about the potential of increased UV radiation reaching the earth as a result of a diminished stratospheric ozone layer caused by CFCs and other chemicals released into the air.

The effects of air pollution on human health vary greatly depending upon the environmental contaminant involved and the nature of the exposure, as well as genetic predisposition and time of exposure. Factors such as the route of exposure, amount of the exposure dose and the length of time of the exposure, combined with individual risk factors, create a wide range of responses to air pollutants.

Medical science is only just beginning to understand the complex effects of air pollution on the human body and the natural world. The human lung has been the subject of considerable research and public education in this regard; other organs and systems have not. Also, insufficient attention has been paid to the impact upon organs and systems of mammals other than man (physiological systems of mammals are frequently similar).

FINDINGS: SPECIAL POPULATIONS ARE AT INCREASED RISK

Children, seniors and minority populations (which tend to live in urban areas with more severe pollution problems) are at special risk. Example: children may be more vulnerable to airborne pollution because their airways are narrower than those of adults. Thus, irritation caused by air pollution that would produce only a slight response in an adult can result in potentially significant obstruction in a young child's airways. Children also have markedly increased needs for oxygen relative to their size. They breathe more rapidly and inhale more pollutant per pound of body weight than do adults. In addition, they may spend more time engaged in vigorous outdoor activities than adults.

FINDINGS: CAUSES FOR CONCERN

Americans, indeed people worldwide, have two primary causes for concern regarding air pollution and health. First is the concern about direct health effects of air pollution in humans exposed to the wide variety of air contaminants found in the outdoor environment, home and workplace. Second is the concern about the adverse effects of air pollution upon the natural world through damage to plants, animals and ecosystem functions that are vital to healthy systems of agriculture, fishing, wildlife, the natural products industry, tourism and recreation. Human health is inseparable from the health of the natural world.

There are no national boundaries to air pollution; worldwide air currents carry pollutants everywhere. Also, air contaminants can pollute soil and water, and can be carried to the rivers and seas of the world.

FINDINGS: AIR POLLUTION PREVENTION

There is no question that air pollution can be a serious public health hazard and that prevention of air pollution will lead to disease prevention. A major education and prevention program should be carried out by the healthcare community, in cooperation with environmental organizations and business, to inform patients and the public of the negative health effects of air pollution.

Progress is being made in air pollution control and prevention through governmental and voluntary private activity, and improved technology in many parts of the industrialized world. Nevertheless, serious health threats continue to exist in the U.S. and around the world caused by outdoor and indoor air pollution.

ORIGIN OF CONCEPT

It should be noted that this conference concept was originally suggested by Dr. Munzer during the founding meeting of the National Association of Physicians for the Environment in February 1993:

"After all, it's not just the lungs and the lower respiratory tract, but also the eyes, the ears, the nose and the skin that are exposed to environmental pollution. It's not just the lung that serves as a gateway for hazardous pollutants, but it's also the gastrointestinal tract. It's not just lung cancer but also bladder cancer that's related to smoking. Lead may be inhaled through the lung, but it has its effect on bone, blood and the central nervous system. Carbon monoxide, too, gains access to the body by the lung, but has its greatest effect on the cardiovascular system."

SUPPORT

The conference was supported primarily by the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health (NIH). Additional support was provided by the National Heart, Lung and Blood Institute (NHLBI) of the NIH. The National Library of Medicine (NLM) of the NIH provided computerized medical literature searches on air pollution impacts on every organ and system of the body which were forwarded to the speakers to assist them in their presentations. In addition, assistance was provided by the American Academy of Otolaryngology-Head and Neck Surgery, Inc., the American Academy of Dermatology, and the American Medical Association. A scientific editor from the Agency for Toxic Substances and Disease Registry assisted in editorial review of the conference summary.

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DOCUMENTS AVAILABLE: Limited copies of the full conference summary will be available after September 20, 1995. The full text of the conference summary will be available September 20 on NApEnet, via the Internet, at: <http://intr.net/napenet> along with other NAPE documents. For further information about NApEnet and its development and use, or if you experience difficulties with NApEnet or have suggestions for improvement, please contact our contractor, InterNetworks, by E-mail at: InterNetworks@shaysnet.com or by fax (508-544-5334).

State wants to study exposure to toxins

Chemicals build up in the body, research shows

By AMY McCONNELL
Monitor staff

State environmental and public health officials, concerned about New Hampshire residents' exposure to a wide variety of chemicals linked to cancer, birth defects and other health problems, are creating a plan to measure that exposure.

The project would evaluate how much arsenic, mercury and chemicals called phthalates have accumulated in the tis-

sues of certain state residents, although officials haven't decided how many people to test. State authorities have applied for a \$1 million grant from the Centers for Disease Control and Prevention to pay for the proposed program, which they hope will provide information on the lingering effects of industrial and household chemicals.

Most of today's environmental regulations try to ensure that when a chemical is released, air remains safe to breath

and water remains safe to drink, according to Richard Rumba of the state Department of Environmental Services. What those rules fail to address, however, are persistent chemicals that concentrate in toxicity as they move up the food chain, he said.

"Persistent, bio-accumulative toxins are generally emitted into the environment at very low or even non-detectable levels, but rather than become diluted, they tend to accumulate in the environment and build up in the tissues of animals

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CHEMICALS

Continued from Page B-1

and humans," said Rumba, the department's air toxics and environmental health program manager, at a news conference yesterday inside the Legislative Office Building.

New Hampshire's proposed study is part of an ongoing national effort by the CDC to create a database of human exposure to not just arsenic, mercury and phthalates but to a host of commonly used chemicals. The agency's second report on exposure, released last week, looked at 116 of the 80,000 industrial chemicals used in the United States.

Federal authorities, according to the CDC, tested subjects' urine and blood for traces of heavy metals like lead and cadmium. They looked for phthalates - which are present in softened plastic, from children's teething rings to medical fluid bags to cosmetics - that are believed to damage the liver and kidneys and

potentially cause birth defects and developmental problems.

They tested for a variety of polycyclic aromatic hydrocarbons, which can be a product of waste incineration and are believed to cause cancer in animals and humans, according to the CDC. They tested for exposure to dioxin, PCBs, tobacco smoke, fungicides, herbicides, insecticides and several kinds of pesticides.

The CDC found that chemicals used in industry, in agriculture and in certain popular consumer goods are present in most of the 10,000 people the agency tested nationwide. The agency found that, among 25 states tested, New Hampshire ranked behind only Pennsylvania in the number of elevated lead levels in subjects' blood. The survey found that 23.4 of every 100,000 New Hampshire residents had elevated lead

levels.

The survey, which also found exposure to several pesticides and to secondhand tobacco smoke at higher levels in children than adults, contradicts claims that commonly used industrial chemicals aren't released in significant amounts, said Jan Perlebury, director of the New Hampshire office of the National Environmental Trust.

"Industry leaders have frequently downplayed the idea that the public is exposed to the chemicals used in products or released as pollution," said Perlebury, who organized yesterday's news conference. "The CDC is providing quantifiable evidence that Americans are in fact bearing the burden of these toxic chemicals in their bodies."

If the New Hampshire project - one of several competing for a limited pool of federal money - receives

funding from the CDC, the state public health labs would begin collecting samples from subjects as early as this fall, according to project consultant Susan Friedrich of the Concord-based Community Health Institute. The results would feed into the database of chemical exposure the CDC is compiling, she said.

New Hampshire authorities, however, are still working to define which groups - such as fishermen who might have eaten fish containing mercury - to examine, Friedrich said. And they are debating how to collect samples in a way that will satisfy federal officials' standards without scaring off would-be subjects, she said.

"We don't want to do a lot of blood-testing because it's harder to get people to get stuck," Friedrich said. "It's a lot easier to get people to give up a little bit of their hair."

Incineration and Human Health
*State of Knowledge of the
Impacts of Waste Incinerators on Human Health*

Michelle Allsopp, Pat Costner, and Paul Johnston
Greenpeace Research Laboratories
University of Exeter, UK
March 2001

www.greenpeace.org/%7Etoxics/reports/euincin.pdf

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